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BRITISH MEDICAL JOURNAL

LONDON SATURDAY JUNE 2 1945

CLINICAL FEATURES OF THE POLIOMYELITIS EPIDEMIC IN MALTA, 1942-3

BY

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AND

H. J. SEDDON, D.M., F.R.C.S.

In Nov., 1942, when the siege of the islands had just been raised, Malta and its small neighbour Gozo were still further stricken by a serious outbreak of poliomyelitis, the first of any note in their history. Between Nov. 15, 1942, and the first week in June, 1943, there were 426 cases in the civilian population, almost all in children under the age of 5 years (Fig. 1). At the same time 57 Service cases occurred, the victims being without exception men from the United Kingdom. The epidemiology of the outbreak has been discussed elsewhere by Seddon, Agius, Bernstein, and Tunbridge (1945). Bernstein, Clark, and Tunbridge describe the clinical features of the Service cases in this issue, at p. 727; the present paper is concerned with those of the civilian outbreak.

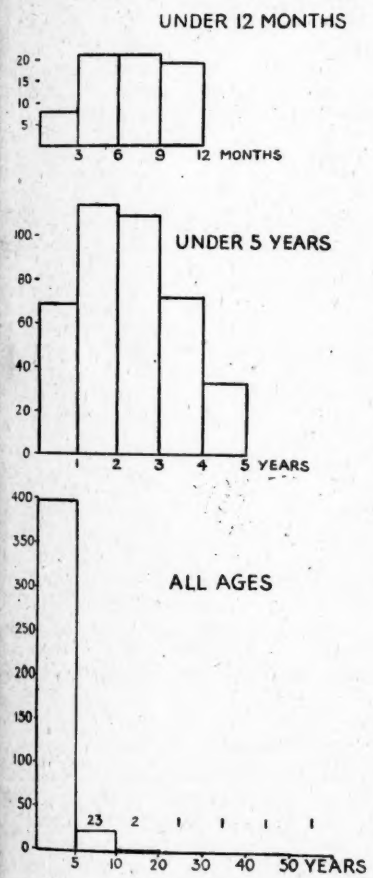

FIG. 1.—Diagram showing the age incidence of cases.

The occurrence of such an epidemic in a community where conditions are otherwise normal is no light matter. In a small island that had been subjected to prolonged and ferocious aerial bombardment, and that had hardly recovered from a food shortage verging on famine, the provision of adequate accommodation and treatment for over 400 cases of poliomyelitis was a task requiring exceptional resourcefulness and determination. Satisfactory accommodation was found within a remarkably short time in the new but uncompleted Government hospital (now known as St. Luke's), though for several months there was a shortage of equipment and of physiotherapists. Improvised wooden splints for the legs and calico slings for the arms were applied under the direction of Prof. J. E. Debono, and the supervision of these small children was so strict that a complete review of all cases made in March and April, 1943, revealed only two in which there was very slight contracture. While the epidemic was in progress there was insufficient time for taking detailed histories of onset; furthermore, at that time many of the mothers were so distraught that it was impossible to obtain coherent stories from them. During February and March, when the state of emergency was coming to an end, one of us obtained detailed histories of onset in all except a very few cases. This information, together with the shorter notes made at the time of admission, gives a fairly clear picture of events during the active phase of the disease. In the spring of 1943 all but five of the survivors were re-examined and the muscle power charted according to the system of notation recommended by the Peripheral Nerve Injuries Committee of the Medical Research Council. This work was most laborious. In older children accurate muscle examination requires time and patience; in infants it is exceedingly tedious, and the results cannot always be regarded as strictly accurate. In every case of doubt a low rather than a high grading was given, and it may well be that the effects of this epidemic will prove less serious than the original forecast suggests. By early March, 1943, only 160 children were in hospital; in the case of out-patients living in towns remote from St. Luke's Hospital the detailed examinations were made at district dispensaries and, as a last resort, in the homes of patients whose parents lacked the means or the inclination to bring their children to a clinic. Under such conditions accurate work was not always possible.

Clinical Features of the Acute Disease

Onset

In some cases the illness was so mild that during the acute phase the child was not put to bed at all; indeed, the symptoms were often so vague that the disease was completely overlooked. In others it was mistaken for some other condition such as paralytic chorea, diphtheria, or meningitis. However, close questioning usually elicited a history of some general disturbance. In a few cases the onset was very acute, with convulsions that seemed to threaten life; it is probable that this was the state of affairs in the case of three patients who died at home. The duration of the acute illness varied between 1 and 17 days, though in most cases the general disturbance lasted for not more than four days. The detailed figures are as follows:

In 59	cases	duration	1 day	In 9	cases	duration	8 days
„ 73	„	„	2 days	„ 5	„	„	9 „
„ 55	„	„	3 „	„ 9	„	„	10 „
„ 46	„	„	4 „	„ 1	„	„	11 „
„ 18	„	„	5 „	„ 4	„	„	12 „
„ 16	„	„	6 „	„ 1	„	„	13 „
„ 17	„	„	7 „	„ 8	„	„	14–17 days

In 10 cases there was no systemic disturbance.

Fever

Out of 396 cases 245 were pyrexial at some time during their illness, there being low fever (below 101°) in 159 and high fever (above 101°) in 86 cases. Rigors were observed in 18 cases. It is probable that fever was present in a greater number than is indicated by these figures, but our information is incomplete. The duration of fever varied; in 159 cases it lasted for not more

than 24 hours, which leads us to suspect that it passed unnoticed in many more. In 56 cases the duration was 2–3 days; 7 cases, 3–4 days; 11 cases, 4–5 days; 12 cases, more than 6 days. Twenty children were afebrile throughout. In a few cases the febrile disturbance disappeared, to reappear at about the time when paralysis developed. The febrile disturbance was present usually at the onset of the disease, though in a few it developed after the paralysis had appeared.

Pain

In view of the youth of most of the patients it is difficult to give the actual incidence of pain, and it may well be that the figures presented here are rather too low. In the very young pain manifested itself in various ways. A child would refuse to have his napkin changed, resented fondling or handling of any kind, and wished to be left alone. In several cases the child would not tolerate being bathed. In one case the mother noticed the child scratching the limb which later became paralysed; there was no local skin lesion. In two cases children complained of a pricking sensation in the limb about 48 hours before the development of paralysis.

The site of pain did not as a rule correspond with the distribution of the subsequent paralysis. For example, pain in the back was followed by facial or deltoid paralysis; pain in the face by paralysis of the lower limbs; pain in one lower limb by paralysis of an upper limb; pain in one lower limb by paralysis of both; and pain in the shoulders by facial palsy. In one case severe orbital pain was followed by paralysis of one lower limb. In another, suprasternal pain was followed by difficulty in swallowing, then by facial palsy. Headache occurred in 72 cases, and was unassociated with any particular kind of paralysis; the cases of cranial nerve palsy were usually unassociated with headache. Pain occurring in a limb which subsequently became paralysed was observed in only 28 cases.

The severity of the pain did not correspond with the extent or severity of the subsequent paralysis. Indeed, many children who complained bitterly of pain escaped with less paralysis than those who did not. In one case pain was severe for three days and nights; both lower limbs became paralysed and yet recovered completely. In a few cases the pain was recurrent and of short duration; in one it moved from limb to limb in a manner that was suggestive of acute rheumatism. On the whole pain was not an outstanding feature in this epidemic. In 96 cases the child cried intermittently as if in distress, and in 57 the crying was no more than a whine or a whimper. In 56 cases the pain was limited to one part of the body, and in 28 it appeared in the part which later became paralysed. Sixty-six children seemed to be sore all over and greatly resented handling; but this was the nearest approach to the characteristic muscle tenderness in acute poliomyelitis that was seen.

Nervous System

(*a*) *Somnolence* was noticed in 150 cases, and in some it was pronounced, the child having to be wakened for his feed, perhaps only to fall asleep again during the course of it. Many of the babies were extremely lethargic. Some children slept at unusual hours or were late in waking up. During the period of sleep or drowsiness a number of children (107) exhibited jerking movements, which were the occasion for considerable alarm. One hundred children had restless nights, though this feature corresponded fairly closely with the incidence of fever. In 6 cases there was a reversal of the sleep rhythm, the child sleeping by day and being restless at night.

(*b*) *Delirium* was noticed in only 20 cases, and occurred generally at night; 13 children had convulsions. Four children lost consciousness for periods of up to 12 hours.

(*c*) Seven children and one adult complained of *vertigo;* one child said repeatedly that he felt like a drunken man, and an adult made a similar complaint. Another child complained that the bed was spinning round, and said he felt dizzy and was going to fall; the vertigo was accompanied by vomiting. In two cases vertigo was aggravated by changing the child's position in bed or by raising the head from the pillow. In one of the cases of vertigo there was a cerebellar disturbance. One child could not tolerate street noises.

(*d*) *Stiffness of the back* was remarkably infrequent; it was observed in only 7 cases. Spasmodic contraction of muscles followed by paralysis occurred in only one case. Tremors and involuntary movements were present in 7.

(*e*) Thirty-eight patients were very *irritable,* even to the extent of throwing things at those who attended them; in 22 cases there was a noticeable change in temperament. Two patients were extremely apprehensive; one of them—the adult who died—was sure long before the end that his illness would be fatal. A rather similar fear seemed to be present in the minds of other children, who complained bitterly when left alone.

(*f*) *Loss of speech* occurred in 6 cases, in three of which there was facial palsy; one child in this group presented typical cerebellar symptoms and signs.

(*g*) *Twitching of the eyelids* was noticed in 11 cases, and strabismus in 2. One case developed bilateral ptosis. Nystagmus was not seen in any of the cases.

(*h*) *Paralysis.*—Except in the 10 cases in which there was no general disturbance it was difficult to determine the exact date of onset of the paralysis; the child was already ill, perhaps in bed, and neither the parents nor the child could say when the diminution in muscle power started. In addition to these 10 cases there were 9 in which a general disturbance followed the paralysis. In most cases the paralysis appeared fairly soon after the onset of the general disturbance; in dealing with such young children it was, unfortunately, impossible for us to be more precise. There were, however, several interesting exceptions. In 12 cases the paralysis developed a number of days after the general disturbance was over, when some children were actually going about again; in 10 the paralysis came on when the child had been up for two days, and in 2 it did not appear until after two weeks. In 13 cases there was, similarly, a general illness followed by apparently complete recovery; then there was a second period of malaise, at the end of which paralysis developed. One case was especially dramatic. A child was ill for a few days, and apparently had recovered completely; eight days later he was taken ill at 3 p.m., and 11 hours later died of respiratory paralysis. It is of course possible that the initial disturbance was not due to poliomyelitis, and it has recently been suggested that certain infections, particularly of the intestine, pave the way for entry of the virus by the alimentary portal.

In a number of cases there was an initial weakness of the limbs, which appeared to be of a temporary nature but later gave place to severe and long-standing paralysis. The weakness was revealed by unsteadiness, with frequent falls, which was often present for some time before the appearance of frank paralysis. In no instance was there an irregular spread of paralysis affecting one limb after another. In three cases the paralysis was ascending and fatal.

The results of examination of the cerebrospinal fluid will not be enumerated, as although lumbar puncture was performed on most cases admitted to hospital the information gained was of no special interest.

A number of children were vaccinated against smallpox or received injections for one reason or another a short time before the onset of poliomyelitis. The four vaccinated cases were inoculated at the usual site in the upper limb, and the subsequent paralyses were as follows: (*a*) vaccination in left upper limb—paralysis of same limb; (*b*) vaccination in left upper limb—paralysis of right upper and both lower limbs; (*c*) vaccination in left upper limb—paralysis of left lower limb; (*d*) vaccination in left upper limb—paralysis of face, left upper and lower limbs. One child was receiving intramuscular injections for whooping-cough; both upper limbs had been injected, and he developed paralysis in one. Five children were receiving antimony compounds intravenously or intramuscularly for leishmaniasis, but in no case could the site of injection be correlated with that of the subsequent paralysis. There is therefore no conclusive evidence that the virus was accidentally introduced by injection.

Alimentary and Respiratory Systems

Anorexia was almost constant, and 12 children complained particularly of thirst. Salivation unrelated to teething was noticed in 14 cases; it was not followed by one form of paralysis rather than another. Dysphagia was present in 5 cases. Vomiting occurred mainly at the onset of the illness, and was observed in 117 cases; it occurred only once in 99, twice in 11, three times in 2 cases, and repeatedly in 2 others. Late and persistent vomiting occurred in 4, retching and vomiting in 3 cases, the retching being a marked feature throughout the acute phase of the illness; retching in the absence of vomiting occurred in 4 cases. Abdominal pain without difficulty in micturition was noticed in 42 cases; it was never persistent, and was easily relieved by hot fomentations; 108 children suffered from constipation—usually obstinate and relieved with difficulty; diarrhoea was present in 5 cases, diarrhoea and tenesmus in 1 case.

An initial coryza was noticed in 80 cases, 6 children had sore throats, and in 28 a cough was present; hoarseness of the voice or cry was observed in 4 cases.

Urinary System

Several children suffered from retention of urine; in other cases the child took a long time to start or complete the act of micturition. In only one case was catheterization necessary.

None of the visceral symptoms that have been described were apparently due to local disturbances, and it was therefore not unreasonable to regard them as manifestations of the ingravescent disease; it was of interest, perhaps of importance, to determine whether symptoms referable to one particular system or body level were followed by paralysis of characteristic distribution. The results of this inquiry were as follows:

	Cases
Gastro-intestinal symptoms followed by paralysis of	
Face	10
Lower limbs	108
Face and lower limbs	2
Upper limbs	16
Respiratory symptoms followed by paralysis of	
Face	2
Upper limbs	5
Lower limbs	50
Gastro-intestinal and respiratory symptoms followed by paralysis of	
Upper limbs	6
Lower limbs	26

Difficult micturition was followed indifferently by paralysis of the upper or lower limb.

Thus it may be concluded that there is no obvious relation between the mode of onset of the disease and the distribution of the subsequent paralysis.

Oedema of the eyelids was a presenting sign in 2 cases; both were sent in with a diagnosis of nephritis, and in neither was any evidence of kidney damage detected subsequently. In 3 cases swelling of joints was an early but transient phenomenon.

Causes of Death

Fifteen patients succumbed to the disease, death being due to respiratory paralysis in 14 and to convulsions in 1; death rate, 3.5%. Twenty-three children died from intercurrent disease, the actual causes of death being the same as those commonly found in the 0–5 years age group in Malta. It is possible that in several cases the paralysis was a contributory cause of death, but even if all fatalities are included the total death rate of 9.0% is not high in an epidemic of some magnitude; it has been suggested elsewhere (Seddon *et al.*, 1945) that this is evidence in favour of the virus being native to Malta rather than imported from another country. By contrast, the death rate among the Service cases was 19.3%, all but two of the fatalities being due to respiratory paralysis; two late deaths were attributed to cerebral anoxia.

Distribution of Paralysis

The original distribution of paresis or paralysis in all the cases is shown in Table I. It will be noticed that the lower limbs alone were affected in 219 cases (51%), and in association with paralysis of other regions in 120 cases, bringing the total of lower-limb paralyses to 339 (79.5%). The upper limbs were involved alone in 45 (10.5%), and with others in 50; cases with upper-limb paralysis thus total 95 (22.3%). The abdominal and spinal muscles were affected in 102 cases (23.9%); all except four had paralysis elsewhere. Facial paralysis occurred in 47 cases (11%); 29 of them showed no other abnormality. The spinal segmental involvement is shown in Fig. 2.

TABLE I.—*Distribution of Muscular Paresis or Paralysis (426 Cases)*

Lower limbs	57
One lower limb	162
Lower limbs; abdominal and spinal muscles	40
One lower limb; abdominal and spinal muscles	33
Upper limbs	3
One upper limb	42
One upper limb and one lower limb	16
One upper limb and both lower limbs	7
Both upper limbs and one lower limb	1
Both upper limbs and both lower limbs	1
One upper limb and both lower limbs; abdominal and spinal muscles	12
Upper and lower limbs; abdominal and spinal muscles	8
One upper limb and one lower limb and spinal muscles	2
One upper limb; abdominal and spinal muscles	3
Abdominal and spinal muscles	4
Facial muscles	29
Generalized weakness	6

NOTE.—Facial paralysis occurred in 18 cases with paralysis elsewhere, so that the facial muscles were affected in 47 cases, or in just over 11% of cases. The sixth cranial nerve was involved in two cases in association with paralysis of the lower limbs. One of these also had a facial palsy. The incidence of respiratory paralysis is not shown; there were 15 cases among the 426.

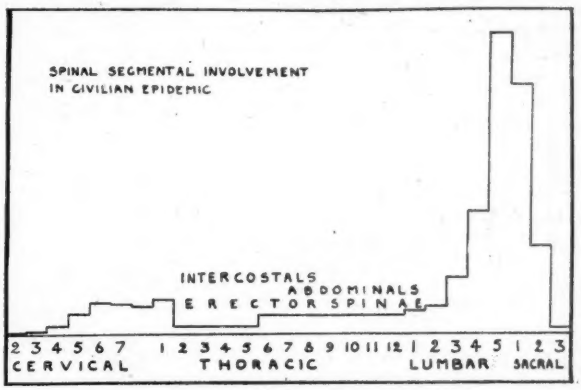
SPINAL SEGMENTAL INVOLVEMENT
IN CIVILIAN EPIDEMIC
INTERCOSTALS
ABDOMINALS
ERECTOR SPINAE
2 3 4 5 6 7 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 1 2 3
CERVICAL
THORACIC
LUMBAR
SACRAL

FIG. 2.—Spinal segmental distribution of paralysis in civilian cases, showing great lumbo-sacral predominance. (Reproduced by courtesy of the Editors of the *Quarterly Journal of Medicine*.)

Treatment

At first the only physiotherapists available were one masseuse and one voluntary assistant. An after-care sister from the Wingfield-Morris Hospital, Oxford, went out with one of us (H. J. S.) at the end of Feb., 1943, and remained in Malta until the end of August. The Army generously permitted the masseuse in charge of the military cases to spend nearly half of her time at the civil hospital, and thus, with the assistance of junior medical officers and V.A.D.s who were given special courses of instruction, it was possible to build up a physiotherapy service which, although admittedly inadequate, was entirely effective in preventing deformity and in providing muscle re-education for such children as were old enough to co-operate. In spite of the language difficulty it was remarkable how intelligent youngsters of 3 or 4 could be taught to carry out exercises appropriate to their individual needs.

Since most of the children were under 5 years of age plaster-of-Paris proved unsuitable for splinting the lower limbs. It was necessary to provide durable splints that would not rust. Thanks to the generosity of Air Vice-Marshal Sir Keith Park, the Air Officer Commanding, we were able to obtain sheet duralumin, from which simple but very effective splints were made. They were even lined with spongy rubber sheeting salvaged from German aircraft. For cases of paralysis of the trunk muscles Bradford frames made of gas-piping were used, the patient being supported by canvas slings and held securely by a linen jacket. Owing to the pressure of work we had at first to be content with plaster-of-Paris and light wire splints for use in paralysis of the upper limb.

The provision of a swimming-pool was not thought to be desirable. It would have been available for only a limited number of patients, it would require an abundant supply of water and fuel—there was a shortage of both—and it would have been necessary to install some form of water-disinfecting plant. Scabies and impetigo were rampant at that time. A suspension apparatus was nearly as satisfactory. Five of these appliances were made, being constructed in such a way that they could be taken to pieces and transported to a clinic by car. The woodwork was done by the carpenter at St. Luke's Hospital, and the springs and other metal fittings were supplied by Col. H. D. Tanner, of the Royal Engineers.

It was estimated that at least 150 children would require some kind of permanent apparatus. A workshop for the supply of "irons" is now in being; the materials necessary for making a start were sent out by the Crown agents, with a supply of boots, of which there was until recently an almost complete dearth.

Recovery

Table II shows the recoveries that were complete by Sept., 1944, while in Table III are details of the recoveries in the cases that still show signs of paralysis of another part of the body.

TABLE II.—*Complete Recoveries*

Distribution of Paralysis	Recovered Within (Months)									Total
	1	2	3	4	6	9	12	15	21	
Lower limbs	2	4	17	1	1	2	1			28
One lower limb	2	6	30	2	1	4	9		1	55
Lower limbs; abdominal and spinal muscles			3		2	3	1			9
One lower limb; abdominal and spinal muscles	1	1	3		2	2	1			10
Upper limbs			1							1
One upper limb	1	4	9			1	4			19
Upper and lower limbs; abdominal and spinal muscles					1					1
One upper and one lower limb	1		1							2
One upper and both lower limbs			1				1			2
Facial muscles	4	3	13				1			21*
Abdominal muscles ..			1					1		2
Generalized weakness ..		2								2
Total	11	20	79	3	7	12	18	1	1	152

* Four other cases of recovery from facial paralysis are not specified in the able but are included among those which recovered from paralysis elsewhere.

TABLE III.—*Partial Recoveries*

Recovery of	Within (Months)									Total
	2	3	4	6	9	12	15	18	21	
Lower limbs		2								2
One lower limb		2	4	3		5	1			15
Upper limbs	1									1
One upper limb	2	1				3		1	1	8
Lower limbs and spinal muscles				1	1					2
One lower limb; abdominal and/or spinal muscles		1		2	4	3				10
One upper and one lower limb								1		1
One upper limb; abdominal and/or spinal muscles						3				3
Abdominal and/or spinal muscles			1	3	7	18	4	1		34
Facial muscles	2	3				1				6
Face and one lower limb ..							1			1
Face; one upper and one lower limb						1				1
Face; upper limbs and spinal muscles						1				1
Total	5	9	5	9	12	35	6	3	1	85

Of the 388 survivors 152 (39.2%) made a complete recovery within 21 months (Table II); and of the 152 about two-thirds (110) recovered within the first three months—which happened to be the period when the provision of physiotherapy was very meagre. This early and unassisted recovery cannot be explained in terms of axonal regeneration; it must represent the return of function in comparatively normal anterior horn cells whose activities had been merely suspended by the disease. There is another peak in the 9–12 months period, when 30 more cases made a complete recovery; but the table suggests that in spite of adequate physiotherapy, such as became available four months after the outbreak of the epidemic, there is not much to be hoped for in the cases still paralysed after 12 months unless a still later peak is found indicating recovery due to axonal regeneration. It may well be that the 30 cases that recovered in from 9 to 12 months were those in which deliberate muscle re-education was required to complete the restoration of function. A more recent, though admittedly incomplete, review of the cases in Jan., 1945, 26 months after the outbreak of the epidemic, is not encouraging; there have been no spectacular improvements since the twelfth month.

The main peak of partial recovery in the cases which still show some paralysis (Table III) was between 9 and 12 months, which suggests that in the more severely paralysed patients physiotherapy may play an important part in bringing about such recovery as occurs.

No fewer than 102 patients suffered from abdominal or spinal paralysis, or both, usually in association with paralysis of other parts of the body. Fortunately only 21 patients have failed to recover good power in the abdominal and spinal muscles, and it is to be hoped that the incidence of structural scoliosis will be low.

The high incidence of facial paralysis—47 cases—was a remarkable feature of the epidemic; in 10 some degree of paralysis is still present and the prognosis must be regarded as bad. In the 29 cases in which there was no associated paralysis the diagnosis of poliomyelitis was based on (1) the absence of other causes, (2) the presence of the same kind of general disturbance as was observed in children suffering from paralysis of the limbs, and (3) the occurrence of the facial paralyses during the epidemic period. The recovery rate was much the same in those cases in which other parts were paralysed as it was in those in which facial involvement occurred as an isolated phenomenon.

A Plan for the Future

It was suggested to the Secretary of State for the Colonies and to the Malta Government that an orthopaedic service should be established to provide not only for the long-term care of the victims of the epidemic but for cripples of every kind. This proposal was received with enthusiasm, and in July, 1943, two more masseuses from England went out to Malta, where, under the guidance of Prof. P. P. Debono, professor of surgery in the Royal University of Malta, they established a physiotherapy department at the Bugeja (Central) Hospital in addition to taking over the work already started at St. Luke's. It is planned to train several Maltese girls at physiotherapy schools in this country, and during their time of training and for some time after they return to Malta the physiotherapy staff will be augmented by two more physiotherapists sent out from Britain.

Mr. A. J. Craig, a Maltese surgeon with experience of general and orthopaedic surgery in this country, has recently been appointed to take charge of orthopaedics in the Maltese Medical Service: he is now organizing his department, and has also been proposed for the post of Lecturer in Orthopaedics in the Royal University. The junior surgeon who was placed in charge of the cases of poliomyelitis from the time of the epidemic until Oct., 1944, is now in this country gaining further experience in general and orthopaedic surgery. In due course he will return to Malta as assistant orthopaedic surgeon. The orthopaedic workshop will form part of the permanent organization.

Conclusions

The clinical aspects of the Malta epidemic presented few unusual features. There are, however, one or two points to which attention should be directed.

One of the earliest and, apparently, most constant signs described by other observers is stiffness of the neck and back so that the patient is unable to approximate the chin to the bent knees. This phenomenon is sometimes referred to as the "spine sign," but its diagnostic significance is evidently doubtful, since not only may it be absent in most cases of poliomyelitis, as in our series, but it may occur in any condition associated with meningeal irritation. The lack of any definite correlation between the prodromal subjective and objective phenomena on the one hand, and the distribution of the eventual paralysis on the other, is as striking as it is unfortunate; not only is the clinician deprived of a valuable pathfinder, but he may even be thrown off the scent by having his attention directed away from the silent paralysis by the clamour of symptoms such as pain in another part, vomiting, etc. This state of affairs may furnish one explanation for the "missed cases" in an epidemic.

In most disease processes the value of pain as an early localizing symptom is well recognized; it was therefore disturbing to find that the site of pain gave little or no indication as to the site of the subsequent paralysis. Muscle tenderness was also inconspicuous. The same was true of the visceral symptoms: there was no more likelihood of a patient developing paralysis of the lower limbs after a gastro-intestinal upset than after a prodromal respiratory disturbance. The occurrence of paralysis of the lower limbs in four out of every five of our cases is in keeping with the findings reported by most other observers.

A curious feature of the epidemic was the high incidence of facial paralysis. It was invariably unilateral, and in the majority of cases disappeared during the first three months. Persistence of the paralysis after that period was accompanied by reaction of degeneration in the affected muscles, and the prospect of recovery must be extremely poor. This was also

our experience with regard to paralysis of any part of the body. The largest number of recoveries took place during the first three months after onset—at a time (as it happened) when little physical treatment was available. A second though much smaller peak in the recovery rate, which occurred during the 9–12 months period, may have been due in part to the influence of treatment. Although the part played by physiotherapy seems to be small, in that no known treatment can bring about regeneration of grossly damaged anterior horn cells, the prevention of contractures and the maintenance of joint mobility are of great value. When recovery is slow and imperfect the importance of muscle training is especially noteworthy. It is therefore only in the early and complete recoveries that physical treatment seems superfluous.

The care of the victims of this epidemic was and still is the work of a team. In addition to those whose names appear in the text we express our thanks to Prof. A. V. Bernard; to the resident medical staff of St. Luke's Hospital, especially to Dr. O. Azzopardi and Dr. V. Zammit-Tabona; to the physiotherapists, Mrs. K. J. Bell, Miss E. J. Charter, Miss P. Empson, Mrs. M. T. Ensoll, and Miss M. B. Quinton; and to the Reverend Mother Superior and her devoted staff of nurses.

REFERENCE

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ACUTE ANTERIOR POLIOMYELITIS AMONG SERVICE PERSONNEL IN MALTA

AN ACCOUNT OF AN EPIDEMIC

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An account is given of the clinical pathological, and therapeutic findings in a series of 57 cases of acute anterior poliomyelitis occurring among Service personnel during the Malta epidemic of the winter of 1942–3. The epidemiological findings of the outbreak have been fully discussed elsewhere by Seddon, Agius, Bernstein, and Tunbridge (1945). Only 4 out of a total of over 400 cases were recorded among the adult Maltese population and none at all among the Maltese troops. The apparent immunity of the Maltese troops is the more striking because they were often working side by side with United Kingdom troops.

Of the 57 cases 2 were from the Royal Navy, 27 from the Army, and 28 from the Royal Air Force. The incidence was proportionately higher among the R.A.F. than among the Army personnel, being 4 to 1. The duration of service in Malta bore no relation to the disease. The average duration among affected personnel was over 12 months (Table I). The four cases with

TABLE I

Duration of stay in Malta:		Period of service:	
1 month and under	4	Minimum	2 weeks
1 to 6 months	7	Maximum	5¼ years
7 „ 12 „	4	Average	Over 12 months
13 „ 24 „	31		
Over 2 years	11		

less than one month's service in the island arrived after the onset of the epidemic. The average duration of the disease before admission to hospital was 3.6 days, with a range from 12 hours to 15 days.

The Preparalytic Stage

In only two instances was information regarding the preparalytic stage not available. In two further cases no paresis developed, and in five additional cases the exact duration was difficult to assess as there was in each instance a history of illness followed by a period of normality lasting 3 to 12 days before the return of symptoms and the onset of paralysis. The average duration of the preparalytic stage in the remaining 48 cases was 3.4 days (Table II).

The proportion of non-paralytic cases was unusually low, and undoubtedly some cases were missed. On the other hand, the medical officers and all the troops were aware of the prevalence of anterior poliomyelitis, with the result that almost all those complaining of headache and fever during the peak period of the epidemic had a routine examination of the cerebrospinal fluid on admission to hospital. By this procedure the diagnosis was established in the two recorded non-paralytic cases.

TABLE II.—*Duration of Preparalytic Period*

12 cases 24 hours or less	6 cases 4 days
6 „ 2 days	7 „ 5–7 days
11 „ 3 „	6 „ 8 days or more

(Average 3·4 days)

5 cases with uncertain preparalytic period (2 or 10, 5 or 14, 3 or 15, 1 or 4, 3 or 10 days); 2 cases, no paresis; 2 cases, data not available

Symptoms.—In 36 cases the onset was sudden and dramatic, the patient presenting some of the symptoms and signs of meningeal irritation. Headache was the most prominent initial symptom, and was recorded in 45 cases (Table III). No new

TABLE III.—*Preparalytic Symptoms in 53 Cases*

Headache	45	Anorexia	8
Muscle weakness	26	Vomiting	6
Pain in back	21	Lassitude	6
„ neck	14	Urinary symptoms	5
„ limbs	13	Abdominal pain	4
Malaise	14	Dysphagia	3
Sore throat and coryza	13	Weakness of eyes	2
Shivering attack	11	Miscellaneous	5

symptoms were observed, nor was there a constant clinical picture applicable to the majority of cases.

Signs.—Pyrexia was noted in 43 cases on admission to hospital, and ranged from 98.8 to 104° F. The fever lasted from 48 hours up to eight days, save in six cases in which the development of secondary infection, respiratory or urinary, prevented an accurate assessment of the duration of pyrexia attributable to the primary disease. Neck rigidity was observed in 20 cases, neck stiffness in 17, Kernig's sign and the spine sign in 12.

The Paralytic Stage

Twenty-six patients complained of weakness of a limb or other part of the body before admission. Muscle tenderness was noted in 30 cases, but in only six did it present with any degree of severity longer than 10 days after the onset of the paralysis. The degree of muscle tenderness bore no relation to the severity of the muscle paresis. In the present series the degree of paralysis was by no means maximal within 24 hours of onset (Table IV).

TABLE IV.—*Cases with Delayed Spread of Paresis*

	Cases		Cases
2 days	2	6 days	1
3 „	3	9 „	1
4 „	3	10 „	1
5 „	2		

(In 8 cases delayed 4 days and over)

The spread of the paralysis was descending in 10 and ascending in 3 cases. In 15 cases the development of the paralysis was not continuous, but was of the "jumping" variety, with an interval of at least 12 hours between the jumps. Included in the jumping cases were nine of the descending and three of the ascending type of spread. Accurate assessment of the extent and the degree of paralysis in the initial stages was often a matter of considerable difficulty. In our experience neither the degree of loss of power nor the degree of alteration of the reflexes was of itself an adequate guide to the severity. Some cases with absence of reflexes in the early stages made a dramatic recovery of power, and vice versa. Further, despite repeated and careful examination, muscles apparently unaffected initially, or even after 10 days, showed definite weakness three to five weeks later. The latter feature is of considerable clinical significance and necessitated keeping the patients in bed for at least four, preferably six, weeks. However trivial the initial paralysis may seem, it is only by keeping the patient in bed for such a period that the extent of the paralysis can be fully assessed and the development of deformity minimized.

Case 14.—Sgt. H., aged 21. Admitted to hospital with a two-days history of headache and pain in the neck. The next day he developed weakness of the muscles of the right shoulder, mainly of the right deltoid. Cerebrospinal fluid: 88 cells per c.mm. (poly-

morphonuclears); protein, 50 mg. per 100 c.cm. No further muscle weakness was recorded during the first three weeks of the illness. Allowed up after one month, when he complained of weakness of the legs. Examination showed weakness of the abdominal, hip flexor, and quadriceps muscles of both legs.

The final distribution of the paralysis for all patients is given in Table V.

TABLE V.—*Distribution of Paralysis*

Cranial nerves:		
Alone	3	14 (24·5%)
With others	11	
Respiratory system (Fatal cases, 11)	16	(28%)
Arms:		
Alone	7	35 (61%)
With others	28	
Legs:		
Alone	3	38 (66·7%)
With others	35	
Trunk:		
Alone	2	28 (49%)
With others	26	
Sphincters:		
Bladder	10	12 (21%)
Bladder and rectum	2	

Respiratory paralysis was observed in 16 cases. The initial symptom was an inability to take a deep breath, and was always complained of by the patient before the detection of any weakness of the respiratory muscles on physical examination. The earliest sign was a weakness of the cough reflex. In at least four cases death was due to central rather than peripheral failure. Patient No. 6 died six and a half months after the onset of the disease, and during the last 12 hours of life had a series of convulsions, each of some minutes' duration, and completely unaffected by the continuous use of the Drinker respirator; necropsy showed no evidence of cerebral abscess or embolus. Analysis of the cases revealed that the later the development of respiratory symptoms after the onset of the disease the greater the prospect of recovery.

Cranial Nerves.—An unusual feature was the presence of nystagmus in 10 cases. In the non-fatal cases the nystagmus rapidly disappeared and was not present after six weeks. In two of the early cases, although nystagmus was observed and recorded, it was not then considered to be due to the virus infection—e.g., Case 26, with diagnostic C.S.F. findings, had nystagmus and a mild degree of weakness of the dorsiflexors of the right ankle and slight diminution of the right ankle-jerk as the only abnormal physical signs. The following cranial nerves were involved: 7th (3 cases), 4th and 6th (2 cases), 12th (1 case). Three patients complained of dysphagia and one case of diplopia. In the civilian cases there was also a high incidence of cranial nerve lesions—11% had facial palsy.

Sphincters.—Retention of urine occurred in 12 cases. In eight the retention was of short duration, lasting only from 36 hours to six days. Suprapubic cystostomy was performed in one of the remaining cases; catheterization was necessary in a further two, and in the remaining case hesitancy still persisted after three months. Two cases had incontinence of faeces in addition to retention of urine.

Recovery.—The rate and degree of recovery varied considerably. Owing to the exigencies of the Service it was impossible to record the final disposal of every case, but in all save seven it was possible to assess the degree of paralysis after three months. Table VI classifies the cases according to the severity of the paralysis.

TABLE VI.—*Severity of Cases: Review Three Months after Onset*

	Non-paralytic	Slight	Moderate	Severe	Fatal	Total
Royal Navy	—	2	—	—	—	2
Army	2	6	2	11*	6	27
Royal Air Force	—	6	8	9	5	28
Total	2	14	10	20	11	57

* Two severe cases are likely to prove fatal within one year.
Non-paralytic = Positive symptoms and C.S.F. findings; no paralysis.
Slight = Mild paralysis; fit for full duty within three months.
Moderate = Definite paralysis, but ultimately should have no serious disability.
Severe = Cases likely to have permanent disability.

Diagnosis

During the epidemic cases of infective hepatitis, undulant fever, enteric fever, fibrositis, infective neuritis, sciatica, pleurisy, coryza, disseminated sclerosis, diphtheritic polyneuritis, cerebral abscess, and hysteria were sent to hospital labelled anterior poliomyelitis. By contrast one or two cases were missed, and were referred to hospital only when the paralysis was fully established. The cerebrospinal fluid findings, together with the clinical history and the distribution of the paralysis, were adequate for establishing the diagnosis. During an epidemic of acute anterior poliomyelitis in a subtropical climate great difficulty may be experienced initially in differentiating between sandfly fever, benign lymphocytic meningitis, and a non-paralytic case. The high percentage of lymphocytes on initial examination of the cerebrospinal fluid in the present series of cases suggests that it is necessary to exercise caution in making a differential diagnosis in the above conditions purely from the cytological examination of the cerebrospinal fluid.

Once paralysis is established difficulty may arise in a mild sporadic case in differentiating between muscular dystrophies, localized neuritis of shoulder-girdle distribution (Spillane, 1943), and acute anterior poliomyelitis.

Three cases were of special interest in that the diagnosis was a matter of considerable difficulty.

Case 15.—Pte. S., aged 26. Admitted to hospital for dental treatment while convalescent from enteric fever. Five days after admission he developed bronchitis, and five days later weakness of the right serratus anterior was observed. The diagnosis of anterior poliomyelitis was discussed, but was considered unlikely by the physician in charge and by the surgical specialist. Lumbar puncture was not performed. A plaster abduction splint was applied, and while in the splint the patient complained of weakness of the right elbow and wrist. Removal of the plaster after three weeks revealed weakness of both serratus anterior muscles, the spinati, right triceps, and extensor muscles of right wrist. Prof. H. J. Seddon examined the case and agreed finally with the diagnosis of anterior poliomyelitis.

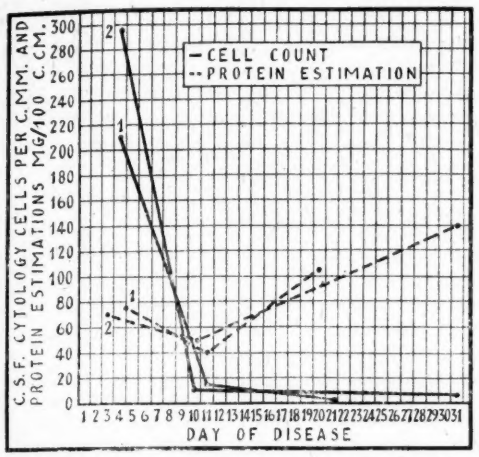
Case 55.—P/O. T., aged 23. Contracted syphilis seven months before admission. He was having antisyphilitic treatment, and had received nine injections of arsenic. He piloted his plane two days before admission, and the following evening complained of weakness of the right leg; a diagnosis of transverse myelitis, ? syphilitic, was considered. The next day, on admission to hospital, flaccid paralysis of the right leg and weakness of the left leg, with no sensory changes, were observed, and the cerebrospinal fluid showed 170 cells (lymphocytes and monocytes) per c.mm. and 200 mg. protein per 100 c.cm.; second day in hospital, paralysis of both legs and weakness of lower abdominal muscles; third day, paralysis of the left half of the diaphragm (blood Kahn ++); fourth day, all abdominal muscles and left half of chest paralysed, and he was placed in a Drinker apparatus; fifth day, paralysis of both sides of diaphragm. Death occurred on the seventh day. Necropsy revealed oedema of the brain with flattening of the gyri, no naked-eye evidence of haemorrhages into the spinal cord, congestion of the lungs, right-sided heart failure, and slight enlargement of the spleen. The micro-anatomy of the nervous tissues is not yet available. There was no microscopical evidence of any syphilitic changes.

Pte. C., aged 27.—On admission, after a history of one day's pain in the limbs and in the neck, this case presented the physical signs of a transverse myelitis, the upper level of the sensory loss being D 9. Wasting of the whole of the erector spinae muscles and of the muscles of the left arm, with a distribution typical of anterior poliomyelitis, developed after admission. The blood Kahn reaction was repeatedly negative and there was no history or clinical or pathological evidence of a syphilitic infection. Brig. D. MacAlpine at first thought the case might be one of anterior poliomyelitis, but in view of the progress of the patient it was later diagnosed as transverse myelitis, and is not included in the present series.

Pathology

Cerebrospinal Fluid.—Lumbar puncture was performed within 24 hours of admission, and in 24 cases was repeated at least once after 7 to 10 days. In 21 cases lumbar puncture was performed on at least three occasions—on admission, at 7 to 10 days, and again 14 to 21 days after the onset of the disease. No definite relation existed between the cell count, the protein content, and the severity of the disease. The cell count was high in the majority of cases. The cells were mainly lymphocytes and monocytes, but in a few instances the polymorphonuclears predominated. In the 11 fatal cases the count upon admission ranged from 100 to 900 cells per c.mm. On the other hand, two severe cases had initially a count of only 40 cells per c.mm. In the series only three cases had a normal cell count upon admission, and in one of these the protein content was raised. In the two non-paralytic cases the cell counts were 112 and 200 respectively—lymphocytes and monocytes pre-

dominating. Repeated examination of the cerebrospinal fluid confirmed the findings of previous workers that the cell count steadily falls, reaching normal limits in 10 to 21 days, whereas the protein content remains raised or continues to rise for 2 to 4 weeks. In a few instances the protein content fell to within normal values after 10 to 13 days, then rose again. This suggests that the finding of a normal cerebrospinal fluid between the 10th and 14th days in a suspected case of acute anterior poliomyelitis does not necessarily exclude the diagnosis (see Graph).



Graph illustrating the fall of the cerebrospinal fluid protein content and the cell count to within approximately normal limits between the 10th and 14th days of the disease in certain cases.

Leucocyte Count.—Examination of the white-cell count was not made as a routine, and the data available were too limited to permit of any conclusions.

Post-mortem Examination

Necropsies were made in all fatal cases—11 adults and 1 child; the latter is excluded from this report. In nine cases death occurred during the acute stage of the illness, and in the remaining two cases after four and a half and six and a half months respectively from the onset of the disease. The spinal cords and brains from four cases were preserved intact and sent to the Central Laboratory, G.H.Q., Cairo, for micro-anatomical and virus examination. Faeces and urine from one fatal case were also sent. In the nine cases in which death occurred during the acute stage the brain was described as oedematous or congested, and the gyri as flattened. Medullary haemorrhages were reported in six cases, pontine and mid-brain haemorrhages in three.

Cardiovascular system: Right-sided dilatation of the heart and congestion were reported in eight cases. Lungs: Congestion was reported in seven cases, collapse in three, bronchopneumonia in three, and pneumonic consolidation with acute abscess formation in one case. The spleen was enlarged and friable in five cases. The liver and kidneys were stated to be congested in five cases. Tardieu spots were reported in four. The principal finding in the two patients dying after the acute stage was right-sided heart failure. In one the lungs were healthy, and in the other there were mild bronchopneumonic changes. The brains showed no macroscopic evidence of congestion, oedema, or haemorrhage.

Treatment

Ward Management.—All doubtful cases were admitted to one ward, where full precautions were taken. The staff wore masks and gowns; the patients had individual crockery, and all faeces and urine were disinfected. Once the diagnosis was established the cases were transferred to another ward. A portion of the latter was set aside for the treatment of cases with respiratory paralysis. At the end of 10 days all cases not requiring the use of the Drinker apparatus were transferred to a convalescent ward, where no further precautions were taken concerning the possible spread of the disease.

Serum Therapy.—Serum was not used in the early cases, the work of the Rockefeller Institute and the Australian Commissions having led us to believe that its use was of little value. Serum, however, was forwarded from the Middle East, and 13 cases received convalescent serum in doses varying from 20 to 150 c.cm. The dosage used was 10 c.cm. intravenously and 40 c.cm. intramuscularly daily for three days. No serum reactions were observed.

Sulphadiazine.—In addition to the serum 10 cases received sulphadiazine. The dosage advised by Brig. MacAlpine was 3 g. twice daily for four days and then once daily for two days. The 3-g. dose was dissolved in 10 c.cm. of distilled water and injected slowly over a period of three minutes. Of the 10 cases only three had the full course. Four cases developed frank haematuria after the administration of 9 to 12 g.; one case had red cells in the urine after 18 g.; one case developed severe vomiting after 12 g.; the remaining patient had to be placed in the iron lung, and died before the completion of the course. Of the 10 patients receiving both serum and sulphadiazine two died. The number of cases treated was too small to be of statistical significance, and owing to the development of complications only three had a complete course. No dramatic improvement seemed to follow the use of this therapy, but, in view of the long preparalytic period in some cases, we feel that it is worthy of a more extended trial.

Respiratory Paralysis.—The serious therapeutic problem during the early stages was the treatment of respiratory paralysis. In these stages of the epidemic sufficient mechanical respirators were not available and respiration was maintained manually. None of the recognized methods of artificial respiration (Schäfer, Silvester) was tolerated by the patients. The only effective method was rapid pressure and release (30+ per minute), applied centrally with the palm of the hand on either side of the lower end of the sternum. One of us (R. E. T.), on observing this, reprimanded the orderly for using an unsound method, as he considered that any benefit derived from such a procedure must be psychological rather than physiological. Further experience suggested that this supposition was untrue, for the unorthodox method did relieve cyanosis, which the orthodox methods failed to do because they distressed the patient. We consider that the reason for the anomaly was the painful character of all movement of the chest on account of the tenderness of the affected muscles.

Through the generosity of the civil Government three iron lungs of the Nuffield pattern were lent to the Army. Lieut.-Col. Tanner, R.E., constructed three respirators of the Drinker type, incorporating several minor modifications which made for greater efficiency. Several Bragg–Paul respirators were sent to the island upon the instructions of the War Office. As a result of the experience gained in the epidemic we found that the Drinker type of artificial respirator did relieve cyanosis—even when all other methods had failed—induced physiological respiration, and gave the patient comfort and confidence, whereas little benefit was derived from the use of the Bragg–Paul type, either in the acute stages or in the treatment of cases still requiring the use of artificial respirators after three months. Oxygen was administered in the cyanotic cases, the B.L.B. apparatus being used.

Sepsis.—Respiratory and urinary sepsis were treated with full courses of sulphapyridine and sulphathiazole. For the lung infections postural drainage was attempted, but in the acute stages of the disease proved too distressing to the patient. The local treatment for infection of the bladder consisted of alternate washouts with oxycyanide of mercury (1 in 10,000) and boric acid solutions.

Muscular Paralysis.—The problem from an orthopaedic standpoint consisted in retaining the muscles in a neutral position during the acute stage, in providing varying forms of splintage to prevent stretching of the paralysed muscles and contracture of their antagonists, and in giving suitable remedial treatment in the convalescent stage pending evacuation of the cases from the island.

Acute Stage.—The neutral position adopted was the supine, with a low pillow just raising the shoulders to avoid stretching the abdominal muscles (as in many cases these particular muscles were affected), but not high enough to stretch the paravertebral groups. The head was similarly supported. The upper limbs were placed in the hips-firm position, the fingers resting lightly on the abdomen just above the iliac

crests, with a reasonable degree of abduction of the shoulders maintained by means of sandbags. The legs were placed together and extended, with the feet supported at a right-angle with a foot-board or with short back splints. Behind the knees a low pillow was placed, giving about 10 degrees of flexion—a position in which there is very little risk of stretching the quadriceps and which avoids the graver danger of the development of genu recurvatum. The legs and feet were further protected with a bed cradle. This position was assumed by all patients except those whose respiratory paralysis necessitated the use of an iron lung, in which provision for the best posture for the arms is absent. An iron lung of the Drinker pattern constructed locally was furnished with an adjustable foot-rack, and a second one was projected in which abduction of the arms could have been accomplished, but the epidemic subsided before the machine was completed. It is noteworthy that all patients who had been treated in the iron lung either developed contractures in the pectoral groups of muscles or experienced discomfort in them during the passive abduction. The neutral position was maintained until the pain and tenderness had gone and the convalescent stage was reached.

Treatment in the Convalescent Stage

All the muscles of each patient were investigated methodically, and as nearly as possible in the clinical examination the power of each individual muscle was assessed and classified according to the M.R.C. nomenclature at 7-day to 10-day intervals. The majority of cases showed paralysed muscles or muscle groups, occurring in all limbs and the trunk indiscriminately. All the cases in which the trunk and lower limbs were affected were maintained in the neutral position, and, where possible, were permitted use of the arm—either unsupported, if the muscles had escaped paralysis, or suitably splinted according to the muscle groups involved.

A notable feature of many cases was paralysis of the abdominal muscles, including the lateral abdominals, the asymmetrical affection of which is so potent in producing a gross scoliosis unless preventive measures are undertaken. Two such cases, in which there was no respiratory paralysis, were immobilized in plaster jackets preparatory to evacuation from the island. Plaster beds would have been preferable, as physiotherapy could have been continued, but they are difficult to adapt for air travel. No patients with lower-limb weakness were allowed to walk save where such weakness was confined to the anterior tibial group, and for these a short walking calliper with drop-foot springs was supplied.

In some patients the paralysis was confined to muscles of the shoulder girdle, and these were given abduction splints. One patient whose main weakness showed in the rhomboids derived considerable benefit from wearing a figure-of-8 bandage, applied as in the treatment of a fractured clavicle. Arm weakness in the patient kept in the supine position on account of trunk and lower-limb paralysis was countered by maintaining abduction at the shoulder with light metal trough splints or plaster splints slung to a transverse bar at the head of the bed. Wrists were supported by short cock-up splints combined, in cases showing paralysis of the intrinsic muscles of the hand, with a knuckle-duster attachment; where the long finger extensors were affected the splint was continued to finger-length. If the thumb was also affected the digit was held into the palm to avoid stretching the muscles of opposition. In one patient the intrinsic muscles of the foot were involved and the toes began to assume a clawed position. For this deformity a pair of wooden sandals were supplied with four slits cut out at the front end, and the proximal phalanges of the toes were bandaged to the intervening prongs.

No limb was completely immobilized, and during the convalescent period light massage and appropriate active exercises were given daily. No active movements were carried out until muscle tenderness had completely subsided, and only such passive movements were used as were unavoidable during nursing. Once active movements had been started particular care was taken to stop them short of fatigue.

All the patients, with the exception of those who required treatment in the iron lung, carried out gymnastic exercises for all muscle groups in warmed water in a specially constructed seven-feet-long pool (funnel-shaped to provide the maximum of room for exercise in the minimum of water in order to economize in fuel for heating and to reduce the rate of heat loss) furnished with rigid head-rests and a supporting pelvic sling on a crane. These water exercises were performed three times weekly, and were very popular with the patients because they seemed to be effortless, a rough idea of progress could be measured by the patients themselves, and the much greater excursion of voluntary movement while in the water was psychologically stimulating.

For those patients who had respiratory paralysis—and in all of them the paralysis of the remainder of the trunk and the limbs was widespread—a suspension frame for the carrying out of active exercises was constructed to imitate the effect of a swimming-pool so far as was possible. The upper limbs were supported on a light metal trough, with troughs for the upper arm and forearm, leaving the shoulder and elbow free, while the wrist was supported by chaining wooden hand-grips to the forearm troughs. These troughs were suspended from the frame by selected cords, attached to the frame by springs made of coiled piano wire. Resistance to the movement was minimal, and the springs afforded considerable resilience to such movements as could be executed. An extension of the frame enabled the lower limbs to be treated similarly, and the active pressing down of the lower limb against the supporting springs proved to be particularly good for exercising the gluteal muscles. In one case a further addition to the frame was a hand-pulley device for exercising the feet by pulling down the hinged foot-pieces of the lower-leg troughs against the counter-springs.

Discussion

The most striking feature of the epidemic was the almost complete absence of cases among the adult Maltese population. This fact, coupled with the high incidence among Maltese infants, would be compatible with the view that the strain of virus responsible for the epidemic was one for which the adult Maltese had some degree of immunity, but not the adults from the United Kingdom. The above facts are also of interest in the elucidation of the origin of the epidemic. Before the outbreak Malta had been besieged, and contacts with the outside world were limited to the movements of a small number of Service personnel. As a result the question of the epidemic having been introduced by the Service had to be considered. Prof. Seddon, after a careful analysis of all the cases, concluded that there was no evidence to support the view that the epidemic was introduced by Service personnel.

The case incidence was high—approximately 150 per 100,000—but the mortality rate was not abnormally high either for the epidemic as a whole or for the adult cases. The unusual clinical features were the high incidence of cranial nerve lesions in both the civilian and the Service cases and the presence of nystagmus in 10 of the latter (17%). Further, in view of the recent controversy concerning the early treatment of acute anterior poliomyelitis, the frequent finding of selective muscle weakness as late as the fourth week after onset suggests that the age of the subject should be taken into consideration before generalizations concerning therapy are made. As a result of the experience gained in the epidemic described, we consider that for an adult case a minimum period of six weeks' absolute rest is advisable.

Treatment of the patient with respiratory paralysis raised many problems. Of the 16 cases with respiratory paralysis 13 were treated in a mechanical respirator. Of the 13 so treated 10 died, and two further cases have such a serious degree of paralysis that they are likely to succumb to a secondary respiratory infection within two years. The distressing appearance of such patients often leads the physician to make frantic demands for a mechanical respirator on misguided humanitarian grounds. In a considerable proportion of cases, more particularly those in which the paralysis begins within five days of the onset of the disease, the respiratory failure is central in origin and no form of artificial respiration is of avail. Morphine, used judiciously, would seem to be the treatment of choice for such cases.

The mechanical respirator, however, has a value in the treatment of cases in which the paralysis is peripheral. In our experience the later the onset of the respiratory paralysis the more likely was it to be peripheral in distribution. In the treatment of respiratory paralysis two varieties of mechanical respirator were used—the Drinker cabinet respirator and the

Bragg-Paul pulsator. In our series the former proved to be the only effective method of artificial respiration. We attribute the failure of the Bragg-Paul pulsator to: (*a*) the limited area of application, which prevents the machine from completely dominating the respiratory action; (*b*) the tenderness of the affected muscles, which induces spasm; (*c*) inability of the machine, when it cannot dominate respiration, to adapt itself to the constantly varying respiratory rhythm; (*d*) the faulty principle of the pulsator, in that inspiration is not purely passive; (*e*) the noise made by the bellows, which is such that the patient tends to expire when he should inspire. Although the Drinker respirator was of value, the constant use of the apparatus required the continuous attention of skilled mechanics and an unfailing supply of electricity. Further, since cases with respiratory paralysis often had widespread muscle involvement the long-continued use of the ordinary type of cabinet respirator prohibited the treatment necessary for prevention of contractures of the upper limbs.

In view of the above facts and the difficulty of transporting artificial respirators it would seem advisable to centralize treatment. It is our considered opinion that for a small outbreak it would be preferable to transfer patients in the initial stages, if necessary by air, to a centre adequately supplied with respirators and full physiotherapeutic facilities rather than to transport respirators.

Summary

The clinical and pathological findings and the early treatment of a series of 57 adult cases of anterior poliomyelitis occurring among Service personnel during the Malta epidemic 1942–3 are described.

There were 11 deaths—a mortality rate of approximately 19%.

In 2 cases no paralysis was noted. In 26 (45%) cases there was no serious final disability.

In 14 (24%) cases the cranial nerves were involved; in 16 cases there was respiratory paralysis; and all the deaths resulted from respiratory paralysis, despite the use of a mechanical respirator of the Drinker cabinet pattern; in 12 (21%) cases there was disturbance of the sphincters.

Convalescent serum and sulphadiazine were used in a small number of cases without any apparent benefit.

The onset of the paralysis was often delayed, and in a few instances was not apparent until the fifth week.

We wish to thank colleagues for their help: Capt. J. C. Lees, R.A.M.C.; Major I. MacPherson, R.A.M.C.; Major A. Charles, R.A.M.C.; Major E. Geal, R.A.M.C.; and Capt. W. S. A. Oakes, R.A.M.C. Also Miss A. M. MacHardy, Q.A.I.M.N.S.(R.), Miss K. Taylor, Q.A.I.M.N.S.(R.), and Sgt. H. E. Fisher, R.A.M.C., for their nursing skill; Mrs. Bell, Massage Corps, for assistance with the massage; Prof. H. J. Seddon and Brig. MacAlpine for their interest and stimulating advice; Lieut.-Col. H. D. Tanner, R.E., for his technical skill and assistance in constructing, under difficult circumstances, the respirator, swimming-pool, and splints; and Brig. W. K. Morrison, D.S.O., D.D.M.S., Malta, for permission to publish this paper.

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THE ERYTHROCYTE SEDIMENTATION RATE IN INFECTIVE HEPATITIS*

BY

J. A. R. MILES, M.B., B.Ch.

In recent years a number of references to the erythrocyte sedimentation rate in infective hepatitis have been published. Ziegler (1941) found that a rise in the E.S.R. often occurred in children in the second or third week after the onset of icterus. Penman (1943), reporting hepatitis in tuberculosis patients in a sanatorium, stated that in about one-half of a series of patients the E.S.R. was markedly slowed when the jaundice was at its worst, but had returned to approximately the pre-jaundice level by the next monthly examination. Any change for the better or worse could not be attributed to the tuberculous process. More recently Wood (1945) gave figures for a small series of cases in the Mediterranean area showing readings below 10 mm. (Wintrobe) in 85% in the first 10 days of the disease and later rising.

* A report to the Medical Research Council.

In the present investigation the E.S.R. has in 80 cases of infective hepatitis been followed throughout their stay in hospital, and observations on a few other cases seen in the pre-icteric phase are reported. Wintrobe tubes were used and the mixed ammonium–potassium oxalate anticoagulant of Wintrobe and Landsberg (1935). Corrections were made for variations in the volume of packed erythrocytes, using the chart published by Whitby and Hynes (1938).

In 40 of the 80 cases the E.S.R. was raised above 10 mm. at some stage of the disease, and it was noticed that in these cases the E.S.R. was low in the acute stage except in a few very mild cases, and then became raised as the patient recovered. Figs. 1 and 2 are graphs in which the bilirubin level and E.S.R. are shown throughout the course of the disease in two severe cases. No relation between the maximum height of the E.S.R. and the clinical severity of the case could be found.

Two Service cases were seen in the pre-icteric phase, and both these had raised sedimentation rates. One of them developed jaundice in hospital, and as his jaundice increased his E.S.R. fell, to rise again to a maximum of 29 mm. at the time when the serum bilirubin was about 1.5 mg. per 100 c.cm. (Fig. 3). Six further pre-icteric cases had sedimentation rates measured in the pre-icteric phase. In four of these the rate was raised. Two of this last group were tested again after they became jaundiced: one, who had become moderately jaundiced, showed a normal E.S.R. in the icteric phase; the other, with only conjunctival icterus, did not show any fall to a normal E.S.R. Of the six cases with an increased rate in the pre-icteric phase, two were raised above 30 mm. in one hour. In five cases the E.S.R. was raised at the time of admission. In one of these the highest recorded bilirubin was 2.3 mg. per 100 c.cm. at the time of admission, and his sedimentation rate of 35 mm. on the same day was the highest recorded.

Particulars of the case of Bdr. C., who was admitted in the pre-icteric phase, are shown in Fig. 3. His bilirubin never rose above 4.8 mg. per 100 c.cm., and his lowest recorded sedimentation rate was 12 mm. in one hour. The other three cases were also clinically mild, having 3, 5.75, and 8.5 mg. per 100 c.cm. as their highest bilirubin, and their E.S.R. continued to rise while the bilirubin was falling.

The mean sedimentation rate of all readings at various bilirubin levels has been estimated in those cases which had a raised E.S.R. at some stage in the disease, and the results are shown in Table I. It can be seen that in this series there is a

TABLE I

Serum Bilirubin in mg./100 c.cm.	Number of Readings	Mean E.S.R. (mm. in 1 hour)
10+	20	5·30
8·1–10	18	8·39
6·1–8	12	8·00
4·1–6	18	10·56
2·1–4	29	14·31
0–2	34	18·94

rise in the E.S.R. as the serum bilirubin falls. The coefficient of correlation is −0.57. The highest recorded E.S.R. in the cases showing some rise, after correction for differences in haematocrit, varied between 11 and 42 mm. in one hour.

The existence of a raised sedimentation rate at least as often in the pre-icteric as in the post-icteric phase in this series, and the very marked negative correlation between the serum bilirubin and the E.S.R., suggest strongly that the normal E.S.R. in the icteric phase is due to some factor inhibiting sedimentation. On the other hand, the sedimentation rate is not so closely bound to the bilirubin figure as to suggest that the normal figure for the E.S.R. in the icteric phase is entirely due to the raised bilirubin (see, for instance, Fig. 3). The following experiments were therefore carried out to discover whether the most obvious abnormalities in infective hepatitis —increased amounts of bile salts and bilirubin in the plasma— were capable of inhibiting the raised E.S.R. in patients with tuberculosis, rheumatic fever, and infective arthritis, or those convalescent from infective hepatitis.

Methods

Oxalated blood was taken, using a minimal amount of Wintrobe's ammonium–potassium oxalate mixture, and cells

and plasma were separated as soon as possible. The cells were washed in normal saline three times in the initial experiments, and in all later experiments six times. A crude bile-salt preparation was dissolved in part of the plasma, and varying final concentrations of bile salts were obtained by mixing untreated plasma with the bile-salt solution in plasma in varying proportions. Pure bilirubin was dissolved in N/20 Na_2CO_3, in 0.85% NaCl at 80° C., and brought back to *p*H 7.5 by the addition of N/1 H_2SO_4, so that the final concentration of bilirubin was 60 mg. per 100 c.cm. Gordon and Wardley (1943) had brought evidence to show that the E.S.R. can be related to the proportions of the various types of protein rather than their absolute amounts, and it was hoped that the electrolyte mixture would have little effect on the E.S.R. When it was present in a dilution of 1 : 6 in plasma the effects were slight, but at 1 : 3 it had a marked inhibitory effect. Washed cells and treated or untreated plasma were mixed in equal volumes, and Wintrobe sedimentation tubes were set up after varying periods. Normally the fall in one hour was read, and the tubes were then spun to find the volume of packed cells and the results corrected for any variations.

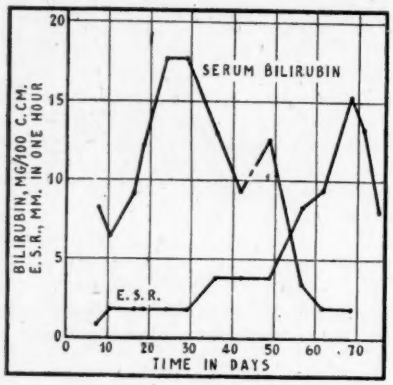

FIG. 1.—Pte. R.

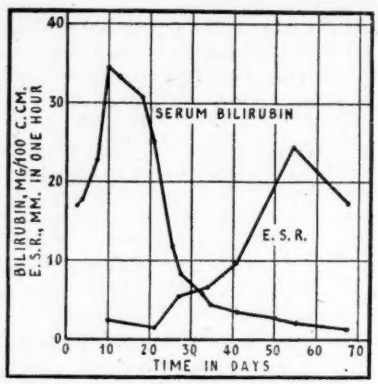

FIG. 2.—Tpr. C.

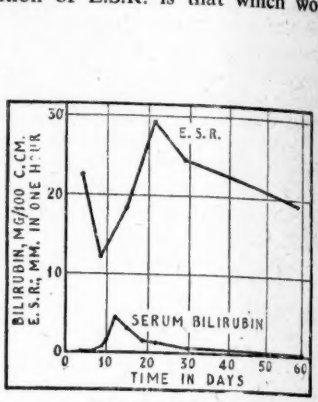

FIG. 3.—Bdr. C.

Experimental

In preliminary experiments it was found that no inhibition of sedimentation occurred immediately after the addition of crude bile salts up to 20 mg. per 100 c.cm., but that if the mixture were left at +2° C. for 18 hours quantities down to 13.4 mg. per 100 c.cm. gave definite inhibition.

In most non-malignant conditions the E.S.R. falls steadily when the blood is stored, and evidence has been put forward by Koster (1937) to show that this is due to diffusion of potassium ions from the erythrocytes into the plasma. Usually when the blood was stored overnight the E.S.R. had fallen too low for any useful observations to be made. Therefore in most experiments the E.S.R. was estimated after blood had been left at 2° C. for 1 to 4 hours. A typical result is shown in Table II.

TABLE II

	Corrected E.S.R. (mm. in 1 hour)	
	After Storing 1 Hour	After Storing 4 Hours
	mm.	mm.
Untreated plasma	30	20
+ 12·5 mg. bile salt ..	29·5	10
+ 25 " " " ..	20	8
+ 50 " " " ..	1	1

It will be seen that when added bile salts were 25 mg. per 100 c.cm. there was some definite inhibition after one hour. When the mixture was stored four hours the E.S.R. in all tubes was lower, but there was definite inhibition at 12.5 mg. per 100 c.cm., as against controls. In cases in which 6.25 mg. per 100 c.cm. of bile salt was added there was no imhibition. The percentage inhibition was related to the amount of bile salts added and the time given them to act, and was approximately the same for all types of case. It was not affected by the initial height of the E.S.R.

Because of inhibition due to the solvent alone it was not found possible to try the effects of more than 10 mg. per 100 c.cm. added bilirubin, but if E.S.R. inhibition were directly due to the excess of bilirubin in the plasma the results tabulated in Table I strongly suggest that this amount should be sufficient to cause very marked inhibition.

The result given in Table III shows that added bilirubin has no effect alone, and that if both bile salts and bilirubin are added the resultant inhibition of E.S.R. is that which would be expected had bile salts alone been added. The E.S.R. was estimated after the blood had been kept four hours in the cold in all the bilirubin experiments.

TABLE III

	Corrected E.S.R. (mm. in 1 hour)
	mm.
Bilirubin 10 mg./100 c.cm.	13
Bilirubin 10 mg./100 c.cm. + bile salt 20 mg./100 c.cm.	7
Bile salt 20 mg./100 c.cm. + 0·1 c.cm. bilirubin solvent	5
Untreated plasma + 0·1 c.cm. bilirubin solvent	11

Discussion

Both Wood and Ziegler have reported a delayed rise in the E.S.R. in infective hepatitis, while Penman in his sanatorium outbreak reports a definite inhibition in the acute stage in one-half of a group of tuberculous patients. Wood does not state how many of his cases were in the pre-icteric phase, but it may safely be assumed that he found fewer cases with a raised E.S.R. in the pre-icteric phase than were found in this series.

Ahlberg (1939) gives the E.S.R. in 36 cases of Weil's disease, in most cases serial weekly figures. In this disease the E.S.R. is raised at all stages, but, as in infective hepatitis, the figures are highest in convalescence. In the first week, using the Westergren technique, he found a mean E.S.R. of 66 mm., which rose steadily to 118 mm. in the fifth week and thereafter slowly fell. In those cases in which figures are given for serum bilirubin there is the same sort of negative relation as in infective hepatitis. Despite the occurrence of haemorrhages anaemia is said not to occur in Weil's disease (Ryle, 1921), and it is quite possible that the relatively low E.S.R. in the acute phase is due to partial inhibition in the early stages, and may well be related to the icterus.

In this series 6 of 8 pre-icteric cases showed a raised E.S.R., and in 40 of 80 cases followed throughout the disease there was a post-icteric rise, while, except in a few mild cases, the E.S.R. was within normal limits in the icteric phase. Further, there was a strong negative correlation between the E.S.R. and the serum bilirubin.

The experiments shown above suggest that an inhibition of the E.S.R. in the icteric phase is more likely due to an increase in the bile salts than in the bilirubin itself, but no figures are available to show whether the amounts of bile salt needed to cause inhibition *in vitro* are likely to be present in the average case of infective hepatitis. Further, one-half of the dose needed to cause inhibition in blood kept for one hour will cause inhibition after 4 hours' storage, and it is possible that if overnight storage were practicable even smaller doses might be effective.

Koster (1937) quoted Bendien, Neuberg, and Snapper (1932) as stating that there is a mobile fraction of non-protein nitrogen, consisting for the most part of polypeptides, which adheres to the proteins when there is a high sedimentation rate and which

moves to the erythrocytes when there is a lagging or an artificial decrease caused by oleate or cholic acid. No attempt has been made to repeat this work, and it has not been possible to obtain access to the original paper; but the need for such a transference would explain the period of storage necessary for bile salts to cause inhibition *in vitro* when present in relatively small amounts. Koster does not state whether Bendien found immediate or delayed inhibition from pure cholic acid.

No attempt has been made to exclude the possibility that the changes in the E.S.R. in infective hepatitis may be entirely due to alterations in the plasma proteins. It has, however, been shown that the low sedimentation rate in the acute phase of those cases of infective hepatitis which show a raised E.S.R. in convalescence is closely related to the icterus, and evidence has been put forward suggesting the possibility that an excess of bile salts in the plasma may be responsible.

Summary

In one-half of a series of 80 cases of infective hepatitis the erythrocyte sedimentation rate was raised at some stage of the disease.

In 6 of 8 cases seen in the pre-icteric phase the E.S.R. was raised above 10 mm. in one hour.

It has been shown that in cases in which the E.S.R. is raised there is a strong negative correlation between the height of the E.S.R. and the serum bilirubin.

Evidence has been produced to suggest that an increase in bile salts might cause an inhibition of the E.S.R. in the acute phase of the disease.

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NECROSIS OF THE LIVER AND BILATERAL MASSIVE SUPRARENAL HAEMORRHAGE IN THE PUERPERIUM

BY

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Necrosis of the liver during pregnancy or early in the puerperium is not uncommon. Sheehan (1940) described 14 cases in a series of 400 necropsies in Glasgow Maternity Hospital. Haemorrhages in association with liver damage are well recognized, but bilateral massive suprarenal haemorrhage is a rare condition in adults; when it occurs it is most often associated with meningococcal septicaemia. Only two cases (Keele and Keele, 1942; Hall and Hemken, 1936) in which suprarenal haemorrhage was associated with pregnancy are recorded, and in both the condition was unilateral. A recent bilateral case is described below.

Case Report

A primigravida, 34 years old, 38 weeks pregnant, was admitted to hospital in labour on Nov. 24, 1944, at 1.45 a.m. She had attended a private doctor during her ante-natal period. The pregnancy had been normal until Nov. 10, when the B.P. was 130/85, there was slight oedema of the ankles, and a trace of albumin was present in a non-catheter specimen of urine. She was advised to rest at home and to avoid meat and fish.

On Nov. 23 labour started at 7 p.m. and she was admitted to hospital as no beds were available at the nursing home where she had booked. On admission her general condition was good—B.P. 136/86 mm. Hg, a trace of albumin in the urine, pulse 80; there was oedema of the legs up to the knees. Labour progressed normally, and she was delivered spontaneously, at 7 p.m. on Nov. 24, of a 7½-lb. living male child. In the third stage of labour about 14 oz. of blood was lost and the placenta was expressed from the vagina half an hour after delivery of the baby. The pulse rate at the end of labour was 100. The patient vomited once during the second stage of labour while using self-administered trichlorethylene, and once again about 1½ hours after delivery of the placenta.

On Nov. 25 the B.P. was 110/66, and pulse 80. She complained of frontal headache, vomited several times throughout the day, and appeared tired and sleepy. On Nov. 26 she still appeared very lethargic; pulse 82. The sclerotics were slightly yellow. There was no complaint of abdominal pain, and no tenderness was elicited on palpation of the upper part of the abdomen. She vomited once this day—a small amount of brown fluid. She still complained of headache, which was severe enough to keep her awake. A tentative diagnosis of acute yellow atrophy was made. She was given 1,000 c.cm. of 5% glucose-saline intravenously and 10 c.cm. of 10% calcium gluconate. On Nov. 27, at 10 a.m., the patient was still lethargic, but the jaundice had not deepened; pulse 82 a minute. There was some tenderness in the epigastrium but no rigidity. At 11.30 a.m. she became comatose. Respiration was slow and deep. There was no response to stimulation. At 12.30 p.m. she had a slight shivering attack. Her condition improved and she responded to stimulation and answered questions. At 2.45 p.m. her condition had improved considerably. She was alert and asked for drinks and food.

Blood investigations: Protein, 3.33% (albumin 1.76%, globulin 1.47%, A.-G. ratio 1.2:1, fibrinogen 0.10%); urea nitrogen, 78 mg. per 100 c.cm.; N.P.N., 105 mg. per 100 c.cm.; uric acid, 15 mg. per 100 c.cm.; van den Bergh—direct reaction, biphasic; indirect, 3.5 mg. per 100 c.cm.; cholesterol, 83 mg. per 100 c.cm.; R.B.C., 2,350,000; haemoglobin 43%; W.B.C. 26,900 (polymorphs 34%, lymphocytes 65%). Swabs were taken from nose, throat, and vagina for culture—all were negative. Examination of a catheter specimen of urine revealed a trace of albumin, some leucocytes, scanty hyaline casts, no crystals. A growth of enterococci was obtained on culture.

In the evening of the 27th she appeared more alert than at any time since delivery, but now complained of pain in the epigastrium below the right costal region. There was some tenderness on pressure over this area. On Nov. 28 the jaundice had not increased, but the pulse had risen to 100. She was drowsy, and still complained of pain under the right costal margin. At 3.30 p.m. she suddenly became very breathless, then comatose; the pulse deteriorated and she died at 4.50 p.m. The temperature was normal during her stay in hospital.

Post-mortem Findings.—The liver was normal in size; its surface was smooth. It was uniformly yellow and no lobular pattern could be seen. There were no haemorrhages. Microscopical examination revealed massive necrosis, involving the whole of many adjacent lobules; within these necrotic areas there were a few small clusters of surviving liver cells. The kidneys were normal in size; the capsules stripped off easily. The surface of the kidneys was smooth and pale in colour. Degenerative changes were present in the second convoluted tubules and in the loop of Henle. The suprarenals were enlarged to three or four times their normal size. They were deep purplish red in colour. On cutting into them blood spurted out. Microscopical examination showed extravasation of blood in the parenchyma of the cortex and some small areas of focal necrosis with leucocytic infiltration. The capsule was not involved, and for the most part the outer zone of the cortex was normal. Examination of the remainder of the body revealed nothing abnormal. There was no evidence of sepsis.

Discussion

The course of events in the above case can be presumed to have been liver necrosis first, followed later by suprarenal haemorrhage. Haemorrhages are of common occurrence in association with liver damage. An unusual feature was the occurrence of massive haemorrhage into both suprarenal glands. The haemorrhage probably occurred on Nov. 26, when the patient complained of pain in the epigastrium, and accounts for the coma on the 27th. The tendency to haemorrhage in liver necrosis may be associated with low fibrinogen content of the blood.

The liver lesion did not resemble that occurring in obstetric acute yellow atrophy as described by Sheehan. He records "a gross fatty change affecting the entire lobule except a sharply defined rim of normal cells around the portal tracts. The affected cells are bloated by a fine foam of small fatty vacuoles throughout the cytoplasm, the nuclei are normal, and there is an entire absence of necrobiotic change." Stander and Cadden (1934) believe that the fatty degeneration precedes actual necrosis. Glynn and Himsworth (1944) in their report of experimental work on the production of liver necrosis and fibrosis state that by killing the animals at the appropriate time specimens showing acute yellow atrophy, subacute atrophy, necrosis, and fibrosis can be obtained. The liver lesion in this case resembled the liver lesion of chloroform poisoning described by Sheehan and of massive necrosis due to dietary deficiency described by Glynn and Himsworth.

From a clinical aspect three contributory factors were present: (1) the toxaemia, (2) the low-protein diet, and (3) the use of trichlorethylene.

The *toxaemia* was slight and could not account for the severe damage found in the liver cells. It may have been the initial lesion.

Low-protein Diet.—The patient was advised to avoid meat and fish for about two weeks before she was admitted to hospital. As she was not under observation during this period the actual diet is not known. Experimentally, Glynn and Himsworth have produced massive necrosis of the liver by feeding rats on a diet deficient in proteins. It is also worth while noting that before the war of 1914-18 massive necrosis of the liver was a rarity in Central Europe (Strümpell, 1921), while during that war and for some years afterwards its incidence increased owing, it was believed, to the general malnutrition. It was commoner among women than men, largely because of the number of cases occurring in pregnancy. The protein requirements of pregnant women are higher than those of the non-pregnant, particularly because of the needs of the foetus in the later weeks of pregnancy. Digestive disturbance, poor appetite, and sometimes faulty absorption all contribute to the development of deficiency and liver destruction.

Against these two aetiological factors many thousands of women with a greater degree of toxaemia have been treated with a more restricted diet for a longer period without such a catastrophe as occurred in this case happening.

With regard to *trichlorethylene*, the patient had a small quantity of this chlorinated hydrocarbon in the second stage of labour. A Freedman inhaler was used. The amount was not enough to produce unconsciousness. The quantity was not estimated exactly, but it was certainly less than half a drachm. The drug is not very volatile, but it is unlikely that an overdose could have been obtained during inhalation through air. Trichlorethylene has been administered by the closed method to many thousands of cases, and liver damage is not mentioned in these reports (Carden, 1944; Gordon and Shackleton, 1943; Haworth and Duff, 1943; Hewer, 1943; Hunter, 1944). It has been administered through air to a large number of women in labour and, so far, no case of liver damage has been reported (Freedman, 1943; Calvert, 1944). Trichlorethylene is known to produce liver damage much more rarely than chloroform. Liver damage due to trichlorethylene in humans has been reported by Willcox (1931), Roholm (1933), and Vallée and Leclercq (1935), and in animals by Herzberg (1934), Meyer (1929), and Castellino (1932).

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At a General Court of the Governors of St. Thomas's Hospital held in London on May 23 an interim report on the reconstruction of the hospital was submitted. St. Thomas's received direct hits on different dates by twelve high-explosive bombs, including one flying bomb, and by a number of incendiaries. The chairman of the reconstruction panel, Mr. H. Winterbotham, said that the interim scheme was designed to cover the period between the end of the war in Europe and the final reconstruction of St. Thomas's. It contemplated the provision of 550 beds in London for in-patients, with facilities for an out-patient department comparable to the pre-war accommodation. Service on this basis was thought to be the minimum needed to maintain the educational standard and the standard of treatment at a proper level. Major Patrick Kinnaird, one of the joint treasurers of the hospital, said that the aim was to have ultimately 1,000 beds compared with the previous maximum of 630. The Lord Mayor of London, who was present at the meeting, emphasized the need to make widely known the prospective deficit of between £30,000 and £40,000, which would have to be made good.

MUMPS MENINGO-ENCEPHALITIS AND ORCHITIS

BY

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AND

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The following case of mumps with meningo-encephalitis and orchitis, which presents some unusual findings, is considered worthy of record. Meningo-encephalitis occurs occasionally as a sequel of mumps, and cases have been described in which meningo-encephalitis either preceded or was the only manifestation of mumps (Howard, 1919; Bedingfield, 1927). Coe (1945) described a case in which meningitis, orchitis, and arthralgia occurred without parotitis. Harris and Bethell (1938) report one case with meningitis and orchitis but no parotitis. They stress the fact that parotitis is only a common complication of mumps and not an essential feature of the disease. Frankland (1941) describes an epidemic of mumps among soldiers in which meningitis was observed without parotitis or orchitis.

Case Report

A soldier aged 26 was admitted to the medical unit of an E.M.S. hospital on March 25, 1944. His illness began on March 23 with a sharp pain in the right lower abdomen, accompanied by pain in the right testicle and slight frontal headache. The abdominal pain was severe enough to keep him awake all night, and by the next morning it had increased further in intensity. At this time his headache was also worse and he complained of giddiness and drowsiness. These symptoms persisted throughout the day, and nausea and mental confusion also appeared. The temperature during the first two days of his illness varied between 103 and 105.2° F. The pulse rate varied between 82 and 90. The personal and family histories were not relevant.

Examination revealed a well-built man who was flushed and mentally confused. Photophobia was present. All tendon and superficial reflexes were exaggerated. The plantar reflexes were extensor. There was a moderate degree of neck rigidity, and Kernig's sign was positive. Ophthalmoscopic examination revealed a moderate degree of bilateral papilloedema. No other abnormalities were observed in the central nervous system. There was slight tenderness in the right lower quadrant of the abdomen and a mild right-sided orchitis was present. There was no lymphadenopathy or splenomegaly. Clinical examination of the heart and lungs was negative, and radiographs of chest and skull revealed no abnormalities. B.P. 115/65.

Laboratory Investigations.—The urine contained a trace of albumin but no sugar. Microscopical examination was negative and culture was sterile. The C.S.F. was clear and contained 9 lymphocytes per c.mm. No excess of globulin was present and the Kahn reaction was negative. Protein, 20 mg. per 100 c.cm.; sugar, 90 mg. per 100 c.cm.; chlorides, 729 mg. per 100 c.cm. Culture was sterile. Culture and animal inoculation for *M. tuberculosis* gave negative results. Blood culture sterile. Widal reaction, negative. Blood Wassermann, Kahn, and gonococcal complement-fixation tests all negative. B.S.R. (Westergren) 20 mm. in first hour. Blood count showed:

	R.B.C.	Hb	W.B.C.	Neutrophils	Lymphs.	Monos.	Bazophils
25/3/44			15,000	84%	11%	5%	—
26/3/44	6·25 m.	100%	10,400	78%	14%	7%	1%
3/4/44		100%	8,600	53%	43%	3%	1%

Progress.—By March 26 the orchitis was more severe, and in view of this and the clinical evidence of meningo-encephalitis, the patient was questioned more closely as to any recent parotid swelling. He then recalled that he had observed slight swelling of the left side of the face and pain on opening his mouth wide three days before the onset of orchitis. The facial swelling and pain had disappeared within 24 hours. Although his orchitis had become more severe, neck rigidity and Kernig's sign were no longer present; he was mentally much clearer, and headache and photophobia were less pronounced. The plantar responses were still extensor, and in the evening of March 26 he developed quick involuntary twitching of the facial muscles. The next day there was great improvement: temperature was normal, and headache and photophobia had disappeared completely. The plantar reflexes were flexor and the papilloedema was clearing. Thereafter he made an uninterrupted recovery, and by April 5 there was no evidence of orchitis and the papilloedema had gone. A further lumbar puncture was done on

March 28. The C.S.F. was then clear and the cell count 3 lymphocytes per c.mm.; protein, 20 mg. per 100 c.cm.

Apart from the usual nursing measures, the only treatment was a course of sulphadiazine starting on March 24 and finishing on March 27, a total of 21 g. being given.

Commentary

In this case an almost latent parotitis was followed three days later by a fairly severe orchitis, 36 hours after which meningo-encephalitis manifested itself. The unusual features were the low C.S.F. cell count, the rather high sugar, and the presence of papilloedema. The mental confusion, drowsiness, twitching of the facial muscles, and the C.S.F. findings indicated an encephalitis. The clinical evidence of cerebral and meningeal involvement would suggest much more extensive changes in the C.S.F. than were actually found. The cell count was only slightly raised and the protein was normal. In the case described by Coe (1945) the cell count varied from 90 to 100 per c.mm. Harris and Bethell (1938) found 740 cells per c.mm. in the C.S.F. of the case they reported. Synge (1930) describes a case with a C.S.F. cell count of 300 per c.mm. In the five cases reported by Frankland (1941) the C.S.F. cell count varied from 230 to 1,078 per c.mm. None of these authors noted papilloedema in their cases, nor was it mentioned by Rolleston (1932). Price (1942), however, states that papilloedema and even optic atrophy occur as a sequel.

The high initial pyrexia and relative bradycardia found in our case conform to previous case reports in the literature. The parotitis was very mild, and its presence was revealed only by a further close questioning of the patient when it appeared to us that mumps alone could explain the presence of a coincident meningo-encephalitis and orchitis. There was no history of any contact with another case of mumps. There was a high initial polymorphonucleosis, but as the orchitis subsided an absolute lymphocytosis developed, as is usual in mumps.

Recovery was complete and rapid. We do not consider that it was influenced to any extent by the use of sulphadiazine.

Summary

A case of mumps with a mild parotitis and a fairly severe orchitis and meningo-encephalitis is described.

The case is unusual in that the C.S.F. cell count was only slightly raised and, apart from slight increase in sugar, the C.S.F. was otherwise chemically normal.

Papilloedema was a feature of the case, but was not followed by any impairment of vision.

We are indebted to the Department of Health for Scotland and to Dr. J. A. Jenkins, medical superintendent, for permission to publish this report.

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Medical Memoranda

Bilateral Ovarian Dermoid associated with a High Degree of Fertility

The case here recorded is of interest in that torsion of the pedicle of a cyst occupying the pelvis is rare, but the main feature is the high degree of fertility and absence of obstetrical mishaps.

Mrs. A., aged 40, was admitted to hospital on March 1, 1943, complaining of abdominal pain and vomiting. Her menstrual cycle was 28/4, and had always been normal until six weeks before admission, when she had intermenstrual bleeding and "cramps in the stomach." On admission the temperature was 99° and the pulse 88. In the right lower abdomen there was a tumour the size of a full-term foetal head which was movable and cystic and did not seem to be tender, although pressure in a downward direction caused pain. Per vaginam there was a blood-stained discharge; the cervix was badly lacerated and had been pushed forward behind the symphysis by a tense and tender tumour in the pouch of Douglas which had no demonstrable connexion with the abdominal tumour.

During examination under anaesthesia the tumour in the pelvis slipped up into the abdomen, when it became apparent that there were two separate ovarian cysts (see Fig.) and a bulky uterus; on opening the abdomen the pedicle of the cyst on the left, which was the smaller, was found to have rotated through two cycles and the walls were very congested. In view of the history of vaginal haemorrhage and the condition of the cervix, it was considered wiser

to remove the uterus along with the cysts. Convalescence was normal.

On being opened both cysts were found to contain a large amount of hair. Microscopical section of the tumours showed them both to be combined dermoid and pseudo-mucinous cystadenomata.

The patient's obstetrical history was as follows: Married at 22. Her first pregnancy ended in an abortion at three months, since when she had had 12 full-term normal deliveries. Each confinement took place at home under the care of a midwife. Her last baby was born 18 months before admission, and she had been a widow for a year.

It is generally accepted that ovarian tumours of this type are of slow growth, and in this case both ovaries must have been the site of these tumours during several of her later pregnancies.

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Cutaneous Anthrax treated with Penicillin

The following case of cutaneous anthrax successfully treated with penicillin may be considered worth recording.

Cpl. A. was admitted on Jan. 12, 1945, complaining of a small blister on the upper half of the left side of his neck which he had noticed for the past 48 hours. He had been feeling cold and off his food all day and had had a rigor, but no headaches, sweating, or constipation. His general condition was good; T. 102.4°, P. 96. The small vesicle on his neck was surrounded by an area of induration, and the adjacent glands at the angle of the jaw were enlarged and tender. Palpation of the abdomen revealed nothing abnormal.

Within 12 hours a circle of vesicles appeared, surrounding a small black centre (see Fig.). Fluid from a vesicle proved that the large Gram-positive organisms of anthrax bacilli were present. No Sclavo's serum was available, so a 5-day course of penicillin was given—15,000 units intramuscularly every 3 hours; a total of 600,000 units. Also 0.6 g. of N.A.B. was injected intravenously, as the clinical efficacy of penicillin in anthrax infection was unknown to us. The pustule was cauterized with pure carbolic acid. The temperature became normal after 24 hours' treatment, and remained so. The black centre became enlarged, and marked adenitis persisted for a week. The patient was discharged 16 days after the onset of his

illness, and when seen on Feb. 4 the black scab had nearly separated off and the adenitis had completely subsided. The only possible source of infection was a new woollen scarf which had been obtained from "Comforts" three days previously.

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Reviews

YEARBOOK OF SURGERY

The 1944 Yearbook of General Surgery. Edited by Evarts A. Graham, M.D. (Pp. 736; illustrated. 18s. 6d.) Chicago: The Year Book Publishers, Inc.

The American Practical Medicine Year Books, which started publication in 1900, serve the same purpose as our *Medical Annual* in that they summarize the more important articles in the medical literature of the year. Whereas the English volume, however, embraces the whole range of medicine, there are no fewer than twelve American books, one for each branch of the subject. The one under review is the *1944 Yearbook of General Surgery,* which we learn from H. K. Lewis and Co. is already out of print.

The usefulness of such a volume depends entirely upon the success with which the editor chooses, from an immense annual output of articles, which to include and which to omit; it must be allowed that Prof. Evarts A. Graham has done his work well. The book runs to over 700 pages and so summarizes a very large number of articles, far too many for even brief mention in a review; they cover the whole of general surgery. We were interested to find that 16 pages were required to summarize the articles upon pilo-nidal cysts, and equally to notice that this condition has now been dubbed "jeep disease." As would be expected, the great majority of the papers summarized are from American surgical literature, but we note a few, such as one on the crush syndrome, from British journals. A short judicial note by the editor at the end of some of the summaries helps to place certain unorthodox procedures in a correct perspective.

As in this country, the production of the book is controlled by a War Production Board, so that, whereas the greater part is printed on semi-art paper, those sections which contain only line drawings are on a non-glossy surface. This gives the book an uneven appearance, which is, however, necessary in the interests of war economy.

HANDBOOK ON PULMONARY TUBERCULOSIS

Pulmonary Tuberculosis. A Handbook for Students and Practitioners. By R. Y. Keers, M.D., F.R.F.P.S., and B. G. Rigden, M.R.C.S., L.R.C.P. With foreword by F. H. Young, M.D., F.R.C.P. (Pp. 273; profusely illustrated. 17s. 6d., plus 7d. postage.). Edinburgh: E. and S. Livingstone. 1945.

This small book is intended to provide the student and practitioner with a concise and up-to-date account of pulmonary tuberculosis, and achieves its object very well. It is neatly arranged and leads the reader methodically and easily through the subject, avoiding unnecessary detail and emphasizing important points. Though the book contains no original matter, the authors have taken pains to include all recent advances which are of proved value; and many physicians who think they "know their tuberculosis" will find new and interesting knowledge in these very readable pages. Courage and common sense are evident throughout the book, and the authors are not afraid to be dogmatic when the results of experience justify confidence. Few chest clinicians will fail to applaud the decision to give higher priority to the *x* rays than to the physical signs in the diagnosis of phthisis, and the radiological section, with its wealth of excellent illustrations, is particularly valuable. The chapters on treatment are full and accurate, and they are marked by that sympathetic sense of proportion which everyone who has to treat this trying disease should strive to acquire. This modest and well-produced book will fill a real gap in the literature of tuberculosis and will help many to acquire a sound knowledge of the subject.

NEURO-OPHTHALMOLOGY

Few clinical branches of medicine are as precise as ophthalmology and neurology. One would therefore expect a book on the neurological aspects of ophthalmology to be clear in its details and general scope. Unfortunately English literature has produced no such book, though there are several excellent treatises on the subject in German and in French. Dr. D. J. Lyle's *Neuro-Ophthalmology* (Baillière, Tindall and Cox; 58s.) is a brave attempt, but hardly fills the obvious gap. Its outstanding features are its anatomical descriptions and the great number of post-mortem studies. Most of its nineteen chapters begin with a detailed anatomical description, but the clinical sections hardly maintain the high level set in the opening parts. Some of the clinical conditions are reduced to little more than a meaningless mass of names, while others are dealt with discursively and too much in the manner of a clinical lecture. The book is beautifully produced and contains a mass of incidental information.

Notes on Books

The "Careers Books," published by Robert Ross and Co. Ltd., now include a small volume entitled *Medicine,* by Dr. GEORGE LUNTZ. This, in the course of 64 closely printed pages, goes over much of the ground covered before the war in our annual Educational Number. It gives a great deal of detailed information compactly arranged, and some advice on how to prepare for a medical career and how to choose a career after qualification, with notes on post-graduate study and medical research and on higher diplomas, etc. Particulars of each of the universities and schools of medicine in Great Britain and Ireland are summarized in appendices. In his preface Dr. Luntz is particular to point out that in this booklet the medical profession has been taken as it is, and no predictions of the form it will assume have been attempted. The distributors are Rolls House Publishing Co. Ltd., 2, Breams Buildings, E.C.4, and the price is 2s. 6d.

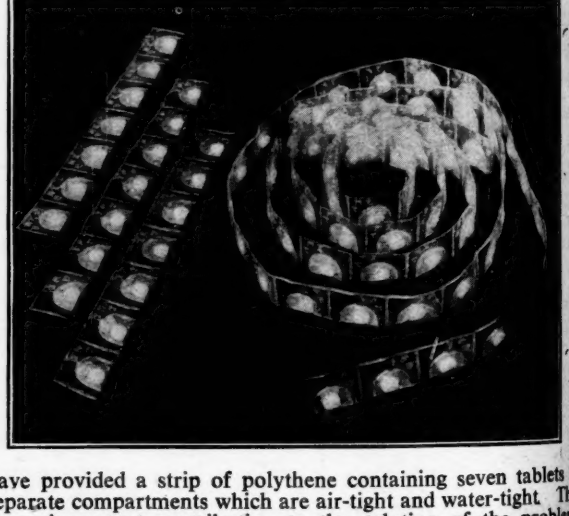
The second edition of *Aids to Fevers for Nurses,* by Miss JOYCE M. WATSON (Baillière, Tindall and Cox; 4s.), the sister tutor of the Park Fever Hospital, L.C.C., contains an excellent account of the subject, which should be in the hands of every nurse.

The official *Medical Register* for 1945 has been published on behalf of the General Medical Council by Constable and Co. (Orange Street, W.C.2) at 21s., post free 22s. The table printed in the introductory section shows that 2,971 names were added last year. New registrations numbered 1,196 in England, 619 in Scotland, 307 in Ireland 320 on the Colonial Register, and 529 on the Foreign Register. The total number of names on the *Register* at the end of last year was 73,646, being 1,764 more than on Dec. 31, 1943. The total number at the end of 1934 was 57,496.

Preparations and Appliances

MEPACRINE PACKED FOR THE TROPICS

One of the minor problems which the Army Medical Services have to face in the Tropics is how to give the soldier tablets of mepacrine, of which he is to take one daily if malaria is to be suppressed. Daily distribution to thousands of men entails great waste of time; yet, if a week's supply is given out at once, the soldier puts the tablets in a pocket where they become dirty or crushed or lost. Imperial Chemical Industries, Ltd.,



have provided a strip of polythene containing seven tablets in separate compartments which are air-tight and water-tight. This is an important contribution to the solution of the problem, which is likely to be appreciated both by the medical officers and the individual soldier. With this packing, which can be rolled up into a small space, the week's supply of mepacrine can be kept unsoiled. The machinery for putting the tablets into the sealed compartments of polythene is provided by Genatosan, Ltd.

BRITISH MEDICAL JOURNAL

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POLIOMYELITIS IN MALTA

From the time of Italy's declaration of war until late in 1942 Malta was subjected to a remorseless aerial bombardment, sustained with a courage that has now become part of our history. It was a cruel blow that in November, 1942, just at the turn of the tide, the virus of poliomyelitis joined in the attack and produced 483 victims. But there is a happier side to the story, told in this week's *Journal*, for it has resulted in the setting up of a permanent orthopaedic service in the island, and the accounts given in these pages and elsewhere by the band of practitioners, Maltese and British, who directed combined operations against the results of the epidemic have added many useful bits of knowledge to the already vast literature on this baffling and dangerous malady. The first striking novelty about the Malta outbreak was that infantile paralysis once again justified its name, for of the 426 civilian cases almost all were in children under the age of 5 years and a substantial number under the age of 1 year. After a period of general disturbance lasting for not more than four days, with pyrexia in the majority, the characteristic paralysis appeared. But there were features of this prodromal period which differ from the picture of the disease which has become accepted in recent years. Pain, for example—allowing for the difficulty of determining this in such young subjects—was not an outstanding feature. Stiffness of the back was remarkably infrequent. Delirium and irritability were noted in a comparatively small number. In other words, the usually accepted signs of a stage of irritation of the spinal meninges were not so prominent as in other recent outbreaks. Indeed, the early symptoms, including those in the alimentary and respiratory systems, were remarkably diverse and there was no obvious relation between the mode of onset of the disease and the distribution of the subsequent paralysis. Nearly four-fifths of the patients developed this, either alone or in association with other groups of muscles, in the lower limbs, suggesting a high rate of involvement of the lumbo-sacral region of the cord. An unusual feature in the civilian cases was the presence of facial paralysis in 11%. The treatment adopted is outlined in the two contributions in this issue: it shows once again the remarkable powers of improvisation by the Services when the need arises. The death rate was low among civilians—only 3.5% directly attributed to the disease—but higher in the 57 Service cases, amounting to nearly one-fifth. As usual, respiratory paralysis accounted for nearly all the deaths, and the record of the Service cases contains some valuable comments on the treatment of this serious complication. The complete recovery of 152 and partial recovery of 85 out of the total 426 civilian cases gives some idea of the severity of the outbreak.

Important as these clinical records are, it is the epidemiological side of the story which will, perhaps, have the greater interest. In view of the state of affairs in Malta when the outbreak occurred it is greatly to the credit of Prof. H. J. Seddon and his colleagues that they are able to marshal the facts and present the arguments in such a convincing manner. Their article[1] comes at a time when the new water-borne theory for the spread of the poliomyelitis virus has been gaining wide acceptance, and the Malta outbreak presents great difficulties for the upholders of this theory. Briefly, the facts can be summarized as follows: After a period of relative immunity—with only 61 cases recorded between 1921 and 1941 and none in 1942 up to the outbreak—the disease appeared first in a civilian in Malta on Nov. 15 and in a Service patient on Nov. 27. Thereafter the epidemic continued until the beginning of March, save for a few late sporadic cases. Altogether 426 civilian cases were recorded and 57 in the Services. What makes this epidemic of especial interest, however, is that 42 of the civilian cases occurred in the small neighbouring island of Gozo. All of these patients (except one—a refugee) were inhabitants of Gozo; the first case occurred on Nov. 21, half-way between the first civilian and the first Service case in Malta; and the distribution of the cases on Gozo failed to conform to a pattern whereby the early cases were in the towns nearest to the main island. In fact, to put the crucial position of Gozo in its full colours, apart from human carriers the only possible common factor that might be of significance was dried milk, distributed on both islands. But the dried-milk hypothesis is dismissed as fantastic, for it would involve assuming that certain batches of milk from well-known firms had become contaminated and that these batches had happened to reach almost every part of Malta and Gozo. Moreover, consumption of dried milk had begun well before the epidemic started, and continued for long after it was over.

With these facts about Gozo in mind, the remaining hypotheses examined by Seddon and his colleagues can be briefly dismissed. Excremental spread has attracted much attention in the last few years in association with the water-borne theory. The sanitary conditions of Malta were in a serious state owing to the bombardment. Moreover, with a threat of famine, the Government had reluctantly given permission for the use of sewage for farming purposes. (No such measures were sanctioned on Gozo, although excrement had long been used for manure there despite the vigilance of sanitary inspectors.) But, whereas the civilian population of Malta might have been infected through contaminated vegetables, it is pointed out that the kitchen technique of the Army and Royal Air Force

[1] *Quart. J. Med.*, 1945, **14**, 1.

would almost certainly have "closed this possible source of the virus." The position of milk has already been examined. Water supplies were not unnaturally complicated, and, indeed, from the distribution of the cases occurring in the first two weeks of the outbreak it would be necessary to postulate the simultaneous contamination of at least four and at most six separate supplies in Malta, to say nothing of the separate supply on Gozo. The case for flies as vectors of the virus is not strong. The rate of development of the disease was too rapid; it was at its height at a period when flies were less numerous than at any other time of the year, and, as already mentioned, if infected flies flew to Gozo it is strange that the first cases did not appear in the towns nearest to Malta. It is concluded that the epidemic was mainly spread by naso-pharyngeal droplets and what are termed "droplet nuclei." The age distribution of the civilian and Service cases suggests that the causal strain of virus must have differed only slightly from the usual endemic Maltese strain, for its successful attacks were confined to the more susceptible civilian age groups. On the other hand, the high incidence and severity of the disease in the Service cases suggest that the strain differed much from that usually endemic in the British Isles. There had been an influx of some 200 airmen in October and November, 1942, and it is conceivable that there were some carriers among them; but the civilian outbreak started nearly two weeks before the first cases in the Services; it was three weeks before an airman succumbed, and the civilian outbreak did not occur in places where there were large concentrations of Royal Air Force personnel. There is thus no real evidence that the infection came from without. Indeed, with the Gozo outbreak to be accounted for, the presence of an indigenous carrier or carriers is strong, and the predisposing factors of overcrowding, physical and nervous fatigue, and an inadequate dietary were all present to help in the spread of what appears to have been essentially an epidemic of infection of the respiratory type.

Howe, Bodian, and Wenner[2] have recently extended their observations on the presence of the poliomyelitis virus in the human oropharynx, recovering it from swabs in 43% of a series of 23 cases during the first three days of illness but never after the third day. These workers do not discuss the presence of the virus during the prodromal period, but other investigators suggest a total period of maximal infectivity of about a week, distributed more or less equally before and after the onset of paralysis. Thus, however the first cases occurred, subsequent spread by droplets, analogous with the spread of cerebrospinal fever, seems the most likely explanation of the Malta epidemic. This almost old-fashioned view of spread, and the high incidence of truly infantile cases with a striking absence of the "spine sign" in the prodromal period, are the outstanding features of a tragic outbreak and take the picture of the disease back almost a generation. Because of this fascinating reversion alone the Malta cases will be studied with great interest. For the courage and enthusiasm with which the epidemic was fought by all concerned, from the Governor, Lord Gort, downwards, it adds yet another distinction to the records of this remarkable island.

[2] *Johns Hopk. Hosp. Bull.*, 1945, **76**, 19.

DISABILITY AFTER CLOSED HEAD INJURY

When a man has had a closed head injury he is more likely to find himself handicapped through defects in his memory, intellectual capacity, and ability to concentrate or through personality changes such as moodiness and irritability, than by discrete disturbances of bodily function. The injuries which result in cranial nerve damage or in local destruction of brain tissue with consequent motor or sensory defect are usually the more severe, or are associated with a fracture of the skull or some other complication. In wartime we have come to regard these complicated injuries as the rule, for gunshot wounds penetrating the brain have produced all manner of disabilities which are not commonly seen in the simple closed head injuries of peacetime. Denny-Brown[1] has recently emphasized the difference in the prognosis of head injuries in peace and war by describing a study of the symptoms which persisted in a large group of civilian patients in the Boston City Hospital who had suffered accidental head injuries. Out of 430 consecutive admissions he selected 200 patients between 15 and 54 years of age who had been normal citizens before the accident. Most of these patients had had mild head injuries, but they represented a sample of the usual run of head injuries admitted to hospital in peacetime. Symptoms persisted for more than six months after injury in over half the cases, although there were only 27 of the 200 patients with a post-traumatic amnesia of longer than 12 hours. The most frequent symptoms were headaches, dizziness, and disturbances of feeling or behaviour grouped together as "psychiatric." Other physical symptoms were present in only 8%. In spite of these symptoms 80% who were not otherwise prevented from returning to full employment did so within two months of leaving hospital. The mental symptoms related to anxiety caused the greatest delay in returning to work. Analysing the factors which may have been responsible for the persistence of these mental symptoms, Denny-Brown found that the severity of the injury and the environmental factors, such as occupational or home worries or concern for compensation, were mainly to blame. He considered intellectual disorder and personality change as relatively unimportant, and concluded that the environment in which convalescence took place was even more significant than the severity of the injury.

These conclusions are of importance, for they affect the whole approach to the prognosis and management in cases of head injury. Whether personality change or intellectual defect is recognized by examination after injury may well depend upon the delicacy of the methods employed. The best method is, of course, to expose the subject to stress and to observe his response. The labourer may show no intellectual impairment to testing or at his work, but the professional man, normal to testing, will later describe evidences of intellectual defect which he had recognized in his work at a level of thought never attained by the labourer. So with personality testing. An intelligent observer who knew the patient intimately before the accident will describe changes in personality in response to stress which must have been a direct result of the injury, but which were not

[1] *J. Amer. med. Ass.*, 1945, **127**, 429.

apparent in the quiet of a hospital. Disturbances of intellect and of personality of this kind cannot be demonstrated by ordinary methods of testing, but the rare patient whose activities are on a high enough plane and who can be honestly introspective will convince the observer of their reality. Though they usually coexist, a change in personality may be appreciated after intellectual recovery seems to be complete. Many excellent studies of this subject have been made in this country. Symonds[2] has dealt with the mechanism of the post-traumatic cerebral state, and Neustatter[3] has demonstrated the difficulty in deciding whether this syndrome is physiogenic or psychogenic. Aubrey Lewis[4] has found it impossible to distinguish the syndrome of a post-traumatic cerebral state from an anxiety state of psychological origin. At the Royal Society of Medicine Patterson, Reynell, and Kremer[5] recently discussed various aspects of the development of post-traumatic personality disorders, and made it clear that disturbances of mild degree may have serious consequences. Schaller[6] has tried to separate the physiogenic from the psychogenic syndromes upon the basis of symptoms, but Denny-Brown[7] has criticized this attempt, and there must be wide agreement with him. It seems, however, that in emphasizing the environmental causes for the persistence of neurotic symptoms after injury Denny-Brown has erred to the other extreme. It is quite true that some patients develop a neurosis out of all proportion to the severity of the head injury as a result of outside factors, which include compensation, head-consciousness, and other causes of anxiety. It is equally true that intellectual disorder may be unassociated with severe disturbances of affect. In the great majority of cases a man who is handicapped by intellectual defect or personality disorder after an injury is unable to withstand the stress of his environment incidental to his injury because of this very handicap. If the stress is slight or the handicap small he may escape with a short illness, but a defect of intellect or personality well enough marked to be measured or recognized in the ward will be a profound handicap to most people. It is not true to say that, because it cannot be demonstrated by such means, it is not present. The patient's future failure to overcome his difficulties as he did before the injury is evidence of its existence. This view does not exonerate environmental factors; it merely relates the psychogenic to the physiogenic causes of the disorder. The possibility of gain from the injury is still a great deterrent to recovery.

The head injuries of war do not differ in this respect from those of peace. The psychological handicaps are different in some ways; the relative incidence of focal and general brain damage is different; but in each case the likelihood of persistent post-traumatic symptoms, particularly mental symptoms, depends on the kind of man who is injured, the kind of injury he has received, and the kind of psychological stress with which he has to contend. The effect of extraneous psychological factors will be influenced by the handicaps in personality and intellect which he had before the injury, as well as those found afterwards.

[2] *Proc. roy. Soc. Med.*, 1937, **30**, 1081.
[3] Ibid., 1942, **35**, 549.
[4] Ibid., p. 607.
[5] Ibid., pp. 557, 561, 564.
[6] *J. Amer. med. Ass.*, 1939, **113**, 1779.
[7] *New Engl. J. Med.*, 1942, **227**, 771.

FIBROSITIS

Increasing attention is being given to the problem of fibrositis, and the scepticism often expressed in the past as to its being a definite pathological entity is giving way under the pressure of such facts as those presented recently by Copeman and Ackerman.[1] In spite of the difficulties imposed by active service conditions they have supported their clinical observations by research into the anatomy and pathology of fibrositis, by both necropsy and biopsy. Attention has been concentrated for a long time upon the painful nodules often met with in fibrositis. The histological characters were fully described by Stockman, though they have been sometimes described as structures found by the fingers of the physician but not by the surgeon's scalpel. Clinicians were reluctant to ascribe the pain and stiffness of fibrositis to these nodules, or to believe that organized fibrous structures could be broken down and the symptoms relieved by heavy massage.

The work of Sir Thomas Lewis on referred pain, amplified by Kellgren, who demonstrated the relation between localized tender spots and referred sciatic pain, aroused fresh interest, and Elliott threw further light on the matter by demonstrating that these spots were associated with areas of increased excitability in the corresponding segment of the spinal cord. Now Copeman and Ackerman have shown that these "trigger points" are associated with certain areas of the back where pink fatty tissue of a particular type lies between the superficial and the deep fascia. The distribution of this fat, which they term "basic fat," forms a pattern found to be constant in many bodies examined post mortem, even in the most emaciated subjects, and coinciding with the distribution of tender spots demonstrated clinically. This fat was also found in close association with tendons, forming their sheaths, and also where the fascia was split to invest a muscle. The fat is vascular and liable to become oedematous and congested, possibly under the influence of meteorological and other influences, and may thus narrow the lumen of the tendon sheaths and cause stiffness and pain. A similar effect may arise in other situations, and this furnishes a far more convincing explanation of the characteristic symptoms of acute lumbago than many other theories. This underlying fat, when congested and swollen, tends to bulge through any weak spots or deficiencies in the enveloping fibrous layers or through the foramina which give passage to the nerves and blood vessels; these herniations form tender nodules and trigger points.

The authors describe various types of herniation—non-pedunculated, pedunculated, and foraminal—and suggest that they may be the seat of chronic strangulation and become hard fibrous nodules: they demonstrated strangulation at operation but not the hard nodules. Treatment by operation or by needling gave striking results in many cases. Further investigations along these lines and verification by other workers will be awaited with interest, but it is evident that an important advance has been made. It may also be observed that service in the R.A.M.C. under war conditions is no bar to research into the problems which beset the civilian practitioner if the thirst for knowledge is present.

PA PING OR BARIUM POISONING

Huang[2] has recently described twelve cases of "Pa Ping," a name familiar to the general population in Szechuen for a transient paralysis similar to familial periodical paralysis. Szechuen is a large salt-producing area, and barium chloride in concentrations as high as 25.69% has been

[1] *Quart. J. Med.*, 1944, n.s., **13**, 37.
[2] *Chin. med. J.*, 1943, **61**, 305.

found as an impurity. All the cases described by Huang were in males, but Du and Dung[3] have observed the disease in females. The symptoms, which usually came on soon after a meal, consisted of nausea, vomiting, diarrhoea, sometimes associated with abdominal pain, abnormal sensation of the skin, and flaccid paralysis of the limbs, first developing in the lower and then gradually affecting the upper. The pupil reaction was always preserved and the mind remained clear. The blood pressure was raised, the pulse rate and body temperature lowered. All the cases described by Huang recovered completely in one to three days, leaving no residual symptoms or signs; but Du and Dung[4] state that the mortality ranges from 5 to 10%. Allen[5] describes a necropsy of one case: there were parenchymatous degeneration and congestion of the liver, heavy congestion in the kidneys with parenchymatous degeneration of the tubules, and eosinophilic infiltration of the mucosa and submucosa of the duodenum, with a patch of hyaline degeneration in one muscle fibre; in the spinal column there was a chromatolysis of nerve cells in Clarke's column; there was also an endothelial swelling of the blood vessels, and a questionable increase in the microglia in the grey matter; congestion was most marked in the nerve roots.

Chou and Chin[6] and Ku, Yen, and Li,[7] believing that barium was the cause of this paralytic syndrome, investigated the pharmacology and toxicology of the soluble barium compounds by means of animal experiments. They administered isotonic barium chloride solution to fasting dogs by gastric tube, and by intraperitoneal, intravenous, intramuscular, and intrathecal injection. When the drug was given by mouth they observed symptoms similar to those occurring in Pa Ping disease. Salivation, vomiting, and diarrhoea were conspicuous, and neuromuscular symptoms such as twitching, tremor, and motor weakness appeared in most cases, followed by paralysis of the skeletal muscles in severe cases. After intravenous injection cardio-respiratory symptoms were more prominent, and a minute amount of barium in the cerebrospinal fluid caused convulsions. Serum concentrations of 2.2 mg. per 100 c.cm. were obtained after ingestion of the barium by mouth, but concentrations of over 5 mg. per 100 c.cm. occurred after parenteral injection. Half the barium was removed from the blood stream in 15 to 30 minutes, and three-quarters within two hours. Although the soluble barium salt may be precipitated rapidly in the gut by inorganic sulphate—and barium sulphate is generally used for opaque meals by radiologists—such precipitation does not occur in the blood stream: here the barium probably forms barium proteinate in the serum.

Huang, thinking that the symptoms of Pa Ping were caused by a low serum potassium, treated two cases with intravenous injections of 80 c.cm. and 145 c.cm. of a 5% potassium citrate solution. In both cases rapid and complete recovery took place immediately after the injections, but unfortunately they did not estimate the serum potassium before treatment. There seems no doubt, however, that the immediate cause of this particular syndrome is the taking of salt or water containing barium chloride as an impurity. The logical treatment, therefore, appeared to be that described by Allen—giving sodium or magnesium sulphate in sufficient doses to precipitate the barium as insoluble sulphate. If the disease is suspected treatment shou'd be immediate, since the absorption of barium chloride is extremely rapid. Now that the cause of the disease is recognized, however, prevention should be accomplished by chemical analysis of brine at the well-head of all salt wells. It seems highly probable that there is a relation between Pa Ping and familial periodic paralysis, and further research should be undertaken to discover whether soluble barium salts in some way disturb the potassium equilibrium in the body. Eight years ago, in some observations on a young man suffering from familial periodic paralysis, Aitken, Allott, Castleden, and Walker[8] found that during the paralytic attacks the serum potassium level would fall from a normal of 20 mg. per 100 c.cm. to less than 10 mg.; 12 mg. per 100 c.cm. appeared to be a critical level below which paralysis developed. They induced attacks by administering large amounts of glucose by mouth, by the injection of insulin, and especially by combined injection of insulin and ingestion of glucose. Potassium chloride by mouth raised the level of potassium in the serum and abolished the paralysis. Aitken and his colleagues concluded that the fall in serum potassium concentration was associated with the passage of glucose from the blood into the tissues, and that abnormal lowering of the potassium level either blocked neuromuscular transmission or inhibited the contractile response in the affected muscles.

ANTIBIOTICS FROM PLANTS

The success of penicillin has led to detailed search for similar products among fungi and soil bacteria, and many substances with antibacterial action have already been discovered. The latest extension of this work is the search for antibacterial substances in the higher plants. The first report on this subject was given by Osborn[9] from the School of Pathology at Oxford. He examined 2,300 species of plants belonging to 166 families by methods similar to those used in estimating penicillin, and he found substances which would inhibit the growth of *Bact. coli* and *Staph. aureus* to occur in 63 different genera. The most active substances were obtained from plants of the Ranunculaceae family, especially anemone, clematis, Christmas rose, and buttercup. The field has been developed further by Lucas and Lewis.[10] They were guided in their search by the clues (1) that the tips of growing roots survive and expand in the presence of innumerable micro-organisms, and (2) that plant drugs have been used all over the world as folk remedies. Extracts were made from various plants and tested for their power to produce a zone of inhibition on agar plates inoculated with *Staph aureus*, with *Bact. coli*, or with certain bacteria pathogenic to plants. Antibacterial principles have been discovered in a variety of plants, though they vary greatly in their potency and distribution. They have been detected in the leaves of Scotch thistles, of verbascum, and of peony, and in the fruits of members of the rose, saxifrage, and other families. In particular a species of honeysuckle, *Lonicera tatarica*, has been found to contain a potent principle which inhibits the growth of *Staph. aureus* and of *Bact. coli*, and another which suppresses coliform bacilli but not Gram-positive organisms. The principles are soluble in water and are stable to heat.

From the therapeutic aspect it must be remembered that the presence of antibacterial activity is only half the picture, and that the absence of undue toxicity is equally important. It is this lack of toxicity which has made penicillin so much superior to the other antibiotic substances so far discovered. But whatever the ultimate findings about these particular preparations, it is clear that the researches in question open up a new field which may well prove to be very fruitful. Moreover, the implications of these results are not restricted to medicine, but may concern wide fields of general biology.

[3] *Ch'n. med. J.*, 1943, **61**, 110.
[4] Ibid., p. 302.
[5] Ibid., p. 296.
[6] Ibid., p. 313.
[7] Ibid., p. 303.
[8] *Clin. Sci.*, 1937, **3**, 47.
[9] *Brit. J. exp. Path.*, 1943, **24**, 227.
[10] *Science*, 1944, **100**, 597.

DIET FOR MALNOURISHED PRISONERS OF WAR

BY

SHEILA KENNY, M.D.

A brief record has been made of 24 recently released British P.O.W.s admitted to hospital in this country for malnutrition and other conditions. The majority had done a long forced march and had been liberated only for periods varying from 2 to 7 days. Before admission 21 had suffered from severe diarrhoea, either during the march or after their liberation, on a sudden return to a full diet.

On receiving the first group one was appalled by their emaciation. However, since enteritis was also an urgent symptom, it was felt that caution in feeding was necessary. No literature on the subject of malnutrition was immediately available, but a decision about the diet had to be made quickly. The problem was to find one which, while suitable for the intestinal tract of men suffering from prolonged starvation, would also restore the depleted body tissues. A simple method was adopted which has, on the whole, proved satisfactory.

Details of Cases

General Condition	Case	Age	Time P.O.W.	March	Enteritis*	Other Complaints	Loss of Weight	Weight on Admission	Weight 2 Weeks Later	Hb on Admission	Hb 2 Weeks Later
			Years				st. lb.	st. lb.	st. lb.	%	%
Poor	1	26	5	+	2, 3, 4	Pulmonary tuberculosis	4 2	7 2	6 10	72	78
	2	32	7/12	+	4	Bronchopneumonia	3 0	8 13	9 1	60	76
	3	26	5	+	1, 2, 3, 4	Gastro-enteritis	2 11	6 10	7 9	76	62
	4	29	3	+	2, 3, 4	Gastro-enteritis; pulm. tuberculosis	3 4	8 7	8 7	74	80
	5	25	5	—	3, 4	Gastro-enteritis; tuberculous pleural effusion	—	7 12	8 1	68	78
	6	52	5	+	1, 3, 4	? Beriberi	?2 10	10 4	10 5	60	68
Fair	7	24	7/12	+	2, 3, 4		4 10½	9 3	11 3	72	78
	8	23	2½	+	1, 3, 4		1 10	8 4	9 2	78	84
	9	38	2⅔	+	1	Furunculosis		7 10	8 6	68	78
	10	25	4 9/12	+	1	Frost-bite of feet	3 2	7 7	8 10	76	66
	11	26	1½	+	2	Lobar pneumonia	2 7	9 7	10 7½	86	78
	12	23	1½	+	1, 2		2 2	8 8	9 12	72	78
	13	31	4 10/12	+	1		2 0	9 0	9 9	56	78
	14	42	1 10/12	+	2, 3, 4		2 8	10 5	10 13½	80	82
	15	41	4	+	2		2 1	8 13	9 12	72	76
	16	22	8/12	+	1, 2		2 4	7 10	9 0	—	70
	17	35	4	+	1		2 3	9 3	10 8	90	92
Quite Good	18	27	4 11/12	—	—		1 11	9 3	10 0	88	80
	19	28	4	+	1, 2, 3, 4		6	10 8	10 9†	90	90
	20	26	4 11/12	+	1		13	9 12	10 3†	98	86
	21	23	7/12	—	2		3	10 0½	10 6†	90	90
	22	28	6/12	—	—		1 3	9 4	9 6	88	84
	23	38	1 3/12	—	—	Active pulmonary tuberculosis (early)	10	10 4	10 8	86	90
	24	35	1 3/12	—	—	Active pulmonary tuberculosis	1 1	8 7	8 10	90	90

* 1 denotes enteritis during the forced march; 2, enteritis during the period between liberation and dietary treatment; 3, enteritis on beginning dietary treatment; 4, enteritis after beginning dietary treatment.

† These cases were fit to be discharged from hospital before they had been here two weeks.

State on Admission

Mental.—Most of the patients were still in a state of extreme elation; if some were not, it was because they were too exhausted physically. This state has gradually subsided to one of remarkable contentment while awaiting fitness for discharge.

Physical.—Apart from the first group (see Table) and the general emaciation, the bodily condition was fairly good. The clinical anaemia was not in proportion to the emaciation, and this finding was supported by the haemoglobin estimations. All the patients were clean, but one was recovering from very severe generalized louse-bites. There were no infectious skin diseases. Mild pyrexia was found in all the active cases of enteritis. Three patients were suffering from septic ulcers of the heels, the result of blisters occurring during the forced march. The condition of the teeth was generally bad. (No dental treatment had been available during captivity.) The abdomen was distended in nearly all cases, even in those not suffering from enteritis on admission. The active cases of enteritis were having loose watery motions—2 to 10 a day.

Treatment

It was decided to put the patients on a third-week gastric diet (modified Lenhartz), with the addition of three eggs daily, and to increase or decrease this diet according to the patient's progress. Half the adult dose of vitamins, cod-liver oil, and iron was considered advisable for the first week, with an increase to the adult dose by the second week. Fersolate tablets seemed to be well tolerated. Plentiful supplies of oranges were available. Mist. opii, catech., et cret. was given two-hourly to the first batch of cases suffering from enteritis; but as this was ineffective in the severe cases—for which reduction from the third-week diet was necessary—it appears that the dietary treatment alone was responsible for clearing the enteritis in the milder cases.

Observations

Patient No. 3 was so ill on admission that it was obvious he could not be put on third-week gastric diet. He therefore received glucose fluids only, by mouth, and 1,000 c.cm. of intravenous plasma, followed by 1,000 c.cm. of glucose-saline in 29 hours. The result was dramatic; within 36 hours of starting parenteral treatment he asked for a poached egg. This was allowed with some misgivings, fortunately unfounded. From then on he was put on a third-week gastric diet, and finally reached sixth-week diet at the same time as the non-enteritic patients. In two other cases also—1 and 4—parenteral fluids were necessary, although these patients were kept on third-week gastric diet before this was realized. Case 1 had prolonged diarrhoea, and Case 4 repeated vomiting. They were both given glucose fluids by mouth, and 1,000 c.cm. of intravenous plasma. In each of these cases also the result was dramatic. (Case 4, now here 3½ weeks, has gained 10 lb. in 10 days: this satisfactory improvement cannot be shown in the Table. Case 1 has been here only 2 weeks.)

Apart from these three cases little difficulty has been encountered. The satisfactory cases were kept on third-week gastric diet for periods of from 48 to 72 hours, and then advanced to fourth-week and so on, slowly, until sixth-week diet, with meat, was reached (this stage was reached within 12 days by all except Cases 1, 2, and 4). Case 6 had developed vomiting—considered due to sweets given him by a neighbouring patient—but he also reached the sixth-week stage on the twelfth day.

The most marked gains in weight have been in the second group. This was to be expected, because the third group had lost relatively less weight, and the first group, besides delay in reaching a fuller diet, were nearly all suffering from some active disease. The weight-recording of Case 6 is interesting. On admission this man had severe painless oedema of legs and feet, present since the end of the march—i.e., about three weeks before admission. (Urine N.A.D.) The diagnosis of wet beriberi was considered. Unfortunately, the vitamin B_1 content of the urine was not estimated. The oedema diminished rapidly while on third-week diet with large intramuscular doses of aneurin. The weight-recordings for this patient are as follows: on admission, 10 st. 4 lb.; one week later, 9 st. 7 lb.; two weeks later, 10 st. 5 lb.; three weeks later, 11 st. 2½ lb.

It is highly significant that in such a small group of very recently liberated prisoners of war there are just over 20% of cases of pulmonary tuberculosis. Three of the 5 cases were unsuspected when

first admitted here. There is likely to be a high percentage of tuberculosis among our returning prisoners—first, because of the terrible degree of malnutrition present; and, secondly, because of the unhygienic conditions of the prison camps. Would it therefore not be wise to keep at least the definitely malnourished men under observation for 6 to 12 months, and *x*-ray their chests at two- or three-monthly intervals?

Conclusions

All cases suffering from malnutrition are liable to develop diarrhoea if put too soon on a full diet. The intestinal mucosa in malnutrition is often oedematous, and, even when it is not, it is reasonable to assume that the gastro-intestinal tract needs "re-education" in the digestion of a normal diet. In extreme malnutrition, body reserves may be so exhausted that not enough are left to supply even the enzymes necessary for digestion. In the less severe cases of malnutrition in which, however, enteritis is already present, milk-feeding might be regarded as an ideal method of "digestion re-education," if such were the only aim in the treatment. But another very important aim is to restore the depleted body tissues. Third-week gastric diet, including three eggs daily, provides an easily digested diet for the first two days' treatment, and is a safe means of observing the patient's digestive powers. From this starting-point advance can be made along the later stages of gastric diet, adding more protein if necessary. That patients do make a satisfactory gain in weight on such a diet is shown by results obtained in 14 days, 12 of which were spent on this diet.

The more severe cases of malnutrition should be put on parenteral fluids without delay. Plasma, although not regarded as an ideal substance for parenteral nutrition, has proved very satisfactory in three fairly severe cases of malnutrition, and may well be used temporarily when supplies of protein hydrolysates are not available.

Summary

Twenty-one cases of malnutrition in recently liberated prisoners of war have been treated by first putting them on third-week gastric diet with additional protein, and then increasing the diet slowly until it is a normal one; this stage was reached on the twelfth day after admission. During the first two weeks the majority of the patients showed a satisfactory increase in weight, and the enteritis present in some cases on admission cleared rapidly.

Three severe cases were given intravenous plasma until fit to be treated like the milder cases.

Just over 20% of the cases have active tuberculosis; hence the advisability of keeping all malnourished prisoners of war under observation for developing tuberculosis for some time after discharge from hospital.

My thanks are due to the medical superintendent for permission to publish these results; to Dr. I. Davies and Dr. H. Evans for their advice; and to the staff of the Whitchurch E.M.S. Hospital for their co-operation in treating the cases.

IMPAIRED WORKERS IN INDUSTRY

AMERICAN EXPERIENCE AND SUCCESSES

BY

HERMANN LEVY

"Physically impaired workers employed in factories are just as efficient in the jobs they hold as their unimpaired fellow workers." This is the conclusion which official American investigators have arrived at after a careful and detailed study of *Impaired Workers in Industry*,* covering 300 establishments with 63,382 impaired workers. The statement conforms to the general experience in this country of the results of methodical and comprehensive rehabilitation of injured workers and their resettlement in industry. It may be taken as another hopeful indication that the Disabled Persons (Employment) Act is a step in the right direction.

The U.S. is, in general, much advanced in the art of special research in the economic and social field. Investigators in that country know well how to make the best use of statistical methods. The present inquiry provides a good many interesting details of a problem whose complexity should not be underestimated. Of the disabled workers covered by it 87% were reported to be just as efficient as the unimpaired doing similar work, and the 8% reported as more efficient outweighed even the 5% reported as less efficient.

Absenteeism may be regarded as a part of inefficiency. The handicapped worker in many cases finds it more difficult to get a job, but once he has it he is anxious to keep it and to prove to himself and to others that he is as good as, or better than, his fellow workers. It is, therefore, not surprising, indeed it is highly gratifying, that in the matter of absenteeism the physically handicapped had a better record than the normal worker. Of the former, 44% were reported as having an absentee record no worse than that of their fellow workers, while 49% had better records; only 7% were absent more than the normal worker.

Accident Proneness

In addition to occupational efficiency and absenteeism there is the problem of the position of the disabled in relation to accidents. Employers have at times been reluctant to employ partially disabled workers, fearing that their handicap might involve the risk of further, possibly even more serious, accidents. Latest experience has indicated, however, that such workers may, through being more careful than their fellows, show a smaller injury risk. In the American inquiry only 2% of the firms stated that some of the employees attempted to obtain compensation for the aggravation of an old injury. As to new accidents the physically handicapped generally experienced fewer injuries; in 38% the accident rate was no higher than in the workers without disabilities and in 51% it was lower; in 11% only was it higher. Similarly, changes of job were less frequent among the disabled.

These results lead to another question which still awaits some clarification. We know through the investigations of the Medical Research Council and the Industrial Health Research Board that generally a relatively small percentage of workers in an establishment encounter a relatively high percentage of accidents. This accident proneness has lately been reaffirmed by another American investigation, which showed that in shipyards 23,188 injuries were received by 8,599 individuals, and that more than half of the workers reported two or more injuries in a year; about 20% of the workers experienced 50% of all reported injuries. Does this definite tendency to accident proneness indicate that injured workers are more liable to sustain another injury than normal workers?

The American report on *Impaired Workers in Industry* seems to supply an answer to this question. The rehabilitated worker is not a person who can be fitted into any industrial job. The utmost attention must be paid to his handicap, to the history of his case, and to a series of psychological and sociological factors if the advantages to be derived from his restored efficiency are not to be lost. The Department of Health for Scotland, in a report on *Health and Industrial Efficiency* in 1943, said that persons invalided out of the Forces as medically unfit for further service "fared badly" socially, medically, and "in relation to work" when left to themselves. The American report, in the statement quoted at the beginning of this article, cautiously speaks of "the jobs they hold." This means that all the good features of efficiency, reduced absenteeism, and fewer accidents presuppose that the impaired worker finds the right job and the right kind of occupation.

Selective Employment

The report makes it clear that the crux of the problem is not just placing the disabled worker in employment but placing him in a suitable job. It will be noted with interest in Britain that of the industrial firms concerned only 7% reported that in their establishments there was no physical examination of the disabled before employment nor had an analysis been made of the jobs suitable for them; 17% reported that applicants were examined physically before being employed, but were not placed on the basis of job analyses; 15% reported

* The investigation was prepared for the U.S. Bureau of Labor Statistics in the Bureau's Division of Industrial Hazards by Clarence A. Trump and Frances J. Montgomery, see *Monthly Labor Review*, October, 1944.

job analyses only; and 61% reported both. The report shows that many firms, big and small, know that it is now common practice to examine an applicant and to study the physical requirements for each job so that he may be placed most advantageously from his own and the employer's point of view. We have heard much in Britain of late about the higher output per man hour of many American industries. It may well be that this selective placing in industry, which so greatly benefits the disabled worker as well, plays an important part in this, quite as much as the introduction of rationalized machinery. Some small firms consider that the increased personnel required would make this procedure too costly for them, but it is suggested in the report that such establishments do not require a full-time medical examiner.

Recognition of the importance of and the need for careful selection of employment for disabled persons opens a wide field of activity for voluntary social service, but it is a service which also pays the employer. The advantages which some firms derive from this selection were recorded. A large aircraft corporation employing 900 physically impaired workers noted that "deaf persons have been found very useful in the riveting departments. Because of the noise involved it has been found that their work is generally better than that of persons with normal hearing. This applies to efficiency on the job, absenteeism, and labour turnover. Blind persons have been used successfully in salvaging operations, mainly in sorting the rivets." Sometimes the almost unbelievable happened: devices such as a mirror for a one-armed operator were so successful that the firm concluded that they were equally helpful to normal operators.

It is evident that employers have a novel, but most encouraging task before them if they will study and adopt the teachings of such sample tests as this. Some firms, after considerable job analyses, reported that they had reached their limit in the employment of rehabilitated workers. Many employers seem to think that these workers are only useful on tedious or repetitive jobs or as clerks and watchmen. Perhaps more thorough analyses, the report observes, of physical requirements would reveal additional posts suitable for them. This conforms with the views long held by one of the foremost surgeons in this country, Mr. E. H. Griffiths; but it is highly desirable that the procedure should not be limited to cases of fracture but should be extended to persons suffering any kind of injury or serious disablement, a point which is not yet fully recognized in this country, where rehabilitation is far too much identified with the task of the surgeon only.

In Canada, not unlike the U.S.A., the re-employment efforts of different industries—metal trades, lumbering, and textiles—have not been uniform; there has been more progress and, indeed, willingness in some than in others. It is interesting to note that the Workmen's Compensation Board in Toronto does not hesitate to point out with reference to the re-employment figures of various trades that one industry should not stay behind another in what the board calls "a patriotic duty" (see *Rehabilitation*, published by the Industrial Accident Prevention Associations, 1943). Societies devoted to voluntary social service can surely inspire their employer-members with the desire to help in the re-employment of the disabled worker and thereby lighten the burden placed on the shoulders of "officialdom" by the future social security legislation.

As to the placing of impaired workers in this country, the necessity for job-analysis, so successfully started in the U.S.A., cannot be over-emphasized. Employers will need it (1) in connexion with their liability under the Reinstatement in Civil Employment Act to reinstate workers in their former occupation or in the most favourable alternative occupation that is reasonable and practicable; and (2) in connexion with their liability under the Disabled Persons (Employment) Act to place a certain quota of disabled persons. As the Industrial Welfare Society discloses in a recent publication on "Reinstatement," firms have asked for a standard schedule of occupations which will help them in the classification of jobs suitable for various disabled persons. It is disconcerting that the Industrial Welfare Society has to inform its members that the only schedule of that kind as yet available is one issued by the U.S. Government; this may be consulted at the library of the American Embassy in London.

U.N.R.R.A.'s MEDICAL AID TO CHINA

Even before the Japanese invaded China her public health services were inadequate for the population, and there was a shortage of doctors, nurses, medicines, and hospital equipment. Now, after eight years of war, there is roughly one doctor for every 40,000 of the population and one hospital bed for every 10,000. Up to 40% of the hospitals have been destroyed or looted, sewage disposal plants have been wrecked, and water supplies contaminated. The danger to national health will be even greater when millions of Chinese who have been driven from their homes start to return. China has, however, a medical relief programme, but it is estimated that she will have to train some 35,000 technicians in the next four years to administer it. In the meantime U.N.R.R.A. has come to her help and is recruiting surgeons, physicians, dentists, nurses, sanitary engineers, maternity and infant welfare specialists, tuberculosis specialists, hospital and public health administrators, among others, for work in China. The first to go there will be men with general medical experience; specialists will follow later when training programmes are set up. Special medical supplies urgently needed by the Chinese universities, including books for teaching purposes, have already been sent, part of the passage being by air. Arrangements have also been made to send 30 medical and health experts to train personnel in the medical centres to be established by the Chinese Government. U.N.R.R.A. will dispatch 90,000 lb. of medical equipment for these centres in the coming months. The Chinese Government plans to establish in the near future training centres in Chungking and Chengtu, and later in Kweiyang. Other centres will be set up in Nanking and Peiping when these cities are freed. Short intensive courses averaging from six to eighteen months will be given to people recruited in China by the Chinese Government. There are to be refresher courses for doctors, public health courses for those who have recently graduated and for nurses who have not had public health experience, technical courses for partly qualified doctors and nurses, and training courses for attendants, nurses, and midwives.

Shipping space has been made available to U.N.R.R.A. to carry the supplies to India, and Dr. Tingfu F. Tsiang, Director of the Chinese Relief and Rehabilitation Administration, has arranged for them to be carried on to China by air.

Medico-Legal

PRISON FOR PRETENDING TO BE A DOCTOR

At Manchester Assizes on May 11 Mrs. Doreen Warren, of Heswell, near Liverpool, pleaded not guilty to the charge of providing a false declaration in order to be registered as a medical practitioner.

Prosecuting counsel said that in June, 1943, Mrs. Warren applied for employment as an assistant to Dr. Lipkin, of Liverpool. She said she was an M.D. of Berlin University. Dr. Lipkin told her he could not employ her unless she was on the *Medical Register*. Mrs. Warren got a Miss Davies to sign a declaration that she had seen her certificate of qualification. The General Medical Council thereupon placed her on the Foreign List of the *Medical Register* as temporarily registered in pursuance of Orders made under Defence Regulation 32B. Dr. Lipkin employed her from November, 1943, to January, 1944. According to the report of the trial in the *Manchester Guardian* Mrs. Warren, when interviewed by the police in August last, said she had qualified by a correspondence course. She declined to go into the witness box. After the jury had returned a verdict of guilty Inspector Colshaw said she was a native of Liverpool. She had told a series of lies. One doctor had said she had not the slightest knowledge of medicine except stock prescriptions.

Mr. Justice Lynskey said he was satisfied that Mrs. Warren had never qualified to practise medicine. For her to treat people, pretending to be a doctor when she was not, might cause serious risk to the community. He sentenced her to six months' imprisonment.

R. G. Smith (*U.S. Nav. med. Bull.*, 1945, **44**, 159) records his observations on 5 out of 40 men on board ship with mumps who developed orchitis, and all received 500 c.cm. of reactivated dried pooled plasma intravenously as an initial dose. The results were excellent and dramatic. One patient received a second 500 c.cm. of plasma when meningitic signs and symptoms appeared.

Reports of Societies

LATENT PERIOD BETWEEN ONSET AND RADIOGRAPHIC SIGNS

On May 18 Dr. JAMES F. BRAILSFORD read a paper to the Radiological Section of the Royal Society of Medicine on the significance of the latent period which elapses in most diseases between onset and radiographic signs.

He said that the radiographic signs did not coincide with the development of clinical signs, but lagged behind them, except in the case of the pulmonary metastases of sarcoma, which might have attained a large size before any clinical signs. The interval between the two manifestations varied not only in different diseases but in different lesions and sites of these diseases. The clinical signs might have disappeared before the radiographic signs appeared, and the latter might persist to the end of the life of a healthy individual. Obviously radiographs during the latent period would reveal no evidence of the disease, though it might be present. Further radiographs must be taken, after an interval depending on the condition, if they wished to obtain confirmatory radiographic evidence. The interval between the first negative radiograph and the request for the second which showed positive signs was usually very much longer than the latent radiographic period, probably because the first radiograph was of a patient with prominent symptoms which had shown some abatement in the interval, the second being only called for because of a recrudescence of symptoms or their failure to clear up within a reasonable time. The radiographic signs also lagged behind and might even seem to increase after the clinical signs had disappeared; hence it was necessary to wait to obtain radiographic evidence of the effect of any treatment. In pulmonary tuberculosis serial radiographs might show the progressive development of small lesions to complete destruction of most of the lungs even under the most favourable circumstances; while in other cases not only might the small initial foci vanish from sight but such spectacular appearances as those associated with miliary tuberculosis, consolidation, cavitation, and pleural effusion might entirely disappear under conservative home treatment. Therefore the severity of the past attack or attacks could not be judged from the residual radiographic appearance. From the latter it could not even be asserted that the disease was inactive, because a latent period followed reactivation; the significance of the radiographic findings could be appreciated only in the light of a previous clinical examination. Without such examination the interpretation of the negative or positive radiographic findings might be very erroneous. Progress in radiological interpretation would only come by helpful co-operation between clinician and radiologist.

The British Council for Rehabilitation held its first study course during the period May 7 to 11. The centres visited were Horton Emergency Hospital; Roffey Park Rehabilitation Centre; Queen Victoria Hospital Plastic Surgery Unit; the Government Training Centre, Slough; Queen Mary's Hospital Limb-fitting Centre; and Queen Elizabeth's Training College for the Disabled. The course began with a general survey by Dr. Harold Balme, and Mr. St. John Buxton, who followed, discussed the orthopaedic aspect of rehabilitation, and among other speakers during the week were Mr. John Hunter, Dr. T. M. Ling, W/O J. E. Blacksell on the work done for burned air-crew patients, Mr. Langdale Kelham, and Mr. E. S. Evans. The final session was devoted to a conference, over which Lord Rushcliffe, chairman of the council, presided, when Mr. Watson Smyth spoke from the point of view of the trainer of the disabled and Mr. S. J. Maude from that of the ultimate employer of those trained. After these opening addresses there was a general discussion.

J. H. Peters, L. Dexter, and S. Weiss (*Amer. Heart J.*, 1945, **29**, 143) record their observations on 56 cases of echinococcus infection of the left side of the heart by echinococcus cysts, to which they add five new cases. Although it is a rarity it represents a type of unusual heart disease for which surgical relief is promising now that improved technique and thoracic exploration have been developed.

Correspondence

Limits and Dangers of Blood Transfusion

SIR,—I was very much interested in the article written by Major-General W. H. Ogilvie (May 5, p. 619), but some of his statements on blood transfusion strike me as being open to criticism. General Ogilvie says: "To-day we know no limits, in amount or rate of administration, other than the needs of the patient." In my opinion there is a grave danger of overloading the circulation, even in an otherwise healthy adult. I know of one strong, healthy young man who was killed during the blitz by the rapid administration of six pints of blood. There was no reaction, but at post-mortem examination the right side of the heart was found to be full of blood to the point of bursting.

The other remark which I question is: "Fit men recently wounded can take any amount of O (IV) blood from a reliable blood bank." Does General Ogilvie consider it safe to give unlimited O (IV) Rh+ blood to an Rh− patient, especially without inquiring if the patient has had previous transfusions?

General Ogilvie is distressed about blood given during such straightforward operations as gastrectomy or resection of rectum. I can see no fundamental error in doing this, especially in the latter operation. Blood is given in these cases to combat shock and make convalescence smooth, and has little to do with loss of blood. The results in these operations have much improved since blood transfusions have been given, and the earlier the transfusions are given the better.—I am, etc.

Newport, Mon. J. T. RICE EDWARDS.

Surgical Lessons of War Applied to Civil Practice

SIR,—I have read with great interest Major-General W. H. Ogilvie's paper on surgical lessons of war applied to civil practice. Perhaps I may be allowed to underline the importance of one of the subjects he mentions—infrequent dressings.

In 1941 I was casualty surgical officer at a busy hospital in North London where we saw perhaps a hundred cases a day. There was a large, central, waiting hall with a skylight but no windows. There might be 50 or 60 people present on any busy morning, waiting on the benches or filing slowly into the M.O.'s room. It was the custom for dressings to be changed daily, and in order to speed up matters patients would often begin to take off their bandages as they advanced along the line; then a nurse with a jerk removed the last layer of gauze and the wound was ready for the doctor—and for contamination by the coughing crowd and the dust raised by children passing the time of waiting by running about. It was very difficult indeed to convince either the patients or the members of the nursing staff that it was not from laziness that I tried to restrict my inspection to temperature reading, palpation of regional lymph glands, and questions regarding severity of pain. Many a patient went away grumbling because he did not have his wound dressed; and the nurses murmured that there was "apparently no need for them any more."

Education will be necessary and the authority of the "honorary" will be needed to back up the junior surgeons in their attempt to alter long-established methods of the casualty department.—I am, etc.,

E. G. HERZOG.

Varicose Veins: War Experience and Civilian Practice

SIR,—I read Major-General Ogilvie's article (May 5, p. 619) with great enjoyment and instruction. Anything he says carries authority to the whole of the English-speaking medical profession and is readily accepted by us, and particularly by the large number of Service surgeons whom he has so ably led, inspired, and instructed. In view of the weight of his opinion, there is one comment that he makes on varicose veins on which I should be glad of the opportunity to write—it is, that the "safest and most satisfactory way of destroying these calf varicosities without harming the deeper channels" is by "surgical extirpation."

In my experience most of these veins can be cured by ligature and injection of the long saphenous vein at the internal malleolus, after the complete Trendelenburg operation (as General Ogilvie details) plus simultaneous injection of 20 c.cm. of 30% saline at both places. Hypertonic saline is an effective and permanent sclerosing agent for varicose veins when used in this way. In addition it is safe, because if some of it does leak into the main circulation it is rapidly diluted to saline and will not damage healthy endothelium. Doses of 20 to 40 c.cm. of 30% saline have been injected into the veins of the arm in my practice since 1923 for the relief of cerebral and post-spinal headaches and restoring the fall in blood pressure that takes place with a spinal anaesthetic.

In a few patients the leg varices will not be effectively sclerosed by ligature of the long saphenous vein at the groin and ankle. Some of them require ligature of one or two communicating veins in the lower third of the internal surface of the leg in addition. These are detected by palpation with the tips of the fingers, for at the point where they emerge through the deep fascia it feels as if there is a hole in the leg. The back pressure in them is high and no sclerosing agent is effective for long. Last, a few people have incompetence of the short saphenous vein, and this must be tied and injected in the popliteal space. I would emphasize, however, that only a small proportion of patients need this treatment of ligature and injection of the communicating veins and short saphenous vein.

It would be a tragedy if surgeons started to treat varicose veins in the leg by surgical excision, for there is a simple and safe cure which has been perfected through the years of the war and tried out on civilian patients over the whole range of working-life, beginning with men and women on war work in their late 'teens to those in their seventies still working. Excising clusters of veins from the legs, apart from being unnecessary and possibly not curative, will be certain to be followed by sepsis and unnecessary incapacitation. It is often an oedematous, eczematous, and ulcerated field, in fact a pest-ridden swamp, and the less surgery here the better.—I am, etc.,

London, W.1. HAROLD DODD.

Carbachol and its Antidote

SIR,—I do not think there is any need to qualify the statement that atropine is an effective antidote for carbachol as Dr. Hugh Dunlop suggests (May 19, p. 710). Atropine antagonizes the action of all choline esters on the heart, the blood vessels, the intestines, the bronchioles, and the central nervous system fully, and does so just as well after the choline ester is given as before. The abolition of the effect of large doses of carbachol by atropine is regularly observed by students in their practical work here. Of course if the injection of atropine is delayed until carbachol, by filling the bronchioles with mucus, has brought the patient to the point of death, his life will not be saved. Dr. Dunlop makes the remarkable statement that: "When, by mistake, the dose of carbachol given is of the order of two hundred times the therapeutic amount the patient exhibits often a phase of severe hypertension." On how many patients, given such a dose, has Dr. Dunlop made this observation? How "often" has he seen such patients? It is true that atropine will not paralyse the action of carbachol on sympathetic ganglia or on the suprarenal medulla, and therefore it is likely that when atropine is used as an antidote for a large dose of carbachol there will be a large rise of blood pressure due to an intense stimulation of the sympathetic system. But this will not kill the patient or do him any permanent harm. It is surprising how little a cat or a dog is affected by a single intravenous injection of a large dose of adrenaline; there may be temporary collapse, but the animal survives.

As for Dr. Dunlop's opinion that the two "mishaps" from carbachol would probably not have been averted by the use of atropine, from my experience with animals I would say it is as safe a prediction as can be made that a patient who has had a large overdose of carbachol can be saved by atropine sulphate. In such an emergency it would be wise to give it intravenously, and to repeat the injection if necessary.—I am, etc.,

Department of Pharmacology, Oxford. J. H. BURN.

Sulphonamides and Measles

SIR,—Dr. L. Sheldon (May 12, p. 680) writes: "The dosage for children of 1 to 6 years was 1/4 tablet four-hourly." On the same page R. J. Eadie writes: "It is rightly recommended in acute infections that where sulphonamide chemotherapy is used i should be administered in full doses, and that the blood concentration should be kept at an efficient bacteriostatic level for the duration of the course, which is limited usually to 7 or 8 days." Surely a dose of 1/4 tablet—a tablet presumably of 0.5 g.—is quite inadequate in an acute infection like measles.

Incidentally, regarding toxicity, I have a letter from the home doctor of a boy who has just come to this school. He says: "I thought it as well to let you know that he is intolerant of sulphonamides in any form and liable to become convulsed and unconscious after quite small doses." I have never seen unconsciousness and convulsions following their administration nor can I recollect having seen them recorded. It would be interesting to know the frequency of these alarming conditions. —I am, etc.,

A. S. HENDRIE, Medical Officer.

Gresham's School, Holt.

SIR,—Reading the enthusiastic reports on sulphonamide treatment of measles, which seem to advocate the routine treatment of all measles cases with one of the sulpha drugs, I feel prompted to record my experiences in 152 cases, seen during the last five years, since I have been using sulphathiazole, sulphadiazine, or sulphamezathine. No case, however serious, was sent to hospital, and none of my patients died. This does not mean much, as the mortality generally has declined to what appears in the last epidemic as under 0.05%. All patients, irrespective of treatment, and with the exception of a few cases of bronchitis and one of bronchopneumonia, were well and up again within a week after the eruption of the rash. In 63 cases reliable temperature charts were kept until five days after the rash appeared. In the great majority of cases thus observed, and probably with all my patients, the temperature dropped to below 100° F. 36 hours after the rash had fully developed, and it remained low without any treatment. It did not matter if the patient looked seriously ill in the prodromal stage or stage of eruption; they were all comfortable 48 hours later.

I have treated only 26 cases of complications, or anticipated complications, with sulphonamides. I was prepared for complications if the temperature remained above 101° F. 36 hours after the rash was fully out. The complications included 6 cases of otitis media, one of which developed otorrhoea during the sulphonamide treatment; 3 cases of capillary bronchitis; 2 cases of bronchopneumonia, one of which developed during the sulphamezathine treatment (probably the initial dose was insufficient); and one of confluent bronchopneumonia in a baby of 15 months, whom I saw for the first time four days after the measles rash. All responded well to massive doses of sulpha drugs, and, with one exception, were well and without pyrexia after 36 hours. Especially gratifying and surprising were the three cases of capillary bronchitis, which all occurred within 48 hours after the rash. The patients were cyanotic, with respirations up to 60, and the ominous pale rash. Contrary to expectation, this condition, which is believed to be caused by the measles virus itself, responded promptly to massive doses of sulphadiazine. Bronchitis in children who had a history of bronchitis, asthma, or whooping-cough in the previous year was not improved by the treatment. I examined practically every case during the eruption stage with the auriscope, and I found a red ear drum in about 25%. Though some of these patients complained of an occasional earache I did not consider it an indication for treatment with sulphonamides. None of these cases developed otitis media. I gave sulphadiazine prophylactically to eight children who had been in close contact with measles, starting five days before I expected the rash to develop. Prodromal symptoms and the rash seemed to be uninfluenced.

There is, in my opinion, no justification for routine treatment of measles cases with the sulpha drugs at present, and under home treatment. Hospital experience may be different, though Joyce Wright, in the *Journal* of March 3 (p. 285), seems to come

to the same conclusion. Complications are few and can generally be kept under control with the sulphonamides when they arise. The stage of "illness" after full development of the rash appears to be too short to warrant treatment with a possibly toxic drug. If sulpha drugs were given on such a large scale undesirable toxic incidents would have to be expected more often.—I am, etc.,

London, W.9. F. MULLER.

Nursing of Measles Patients in Hospital

SIR,—With recommendation (*a*) of Dr. Joyce Wright's paper on ear disease in measles (March 3, p. 288) everyone should agree. A minimum of 12 feet between bed centres should be the rule in every ward in which infections of the upper respiratory tract form a part of the work. To this we may add that no bed centre should be nearer to the end wall than 6 feet. These two points, with sufficient space between the ends of the beds, may be said to make up the internal ventilation of a ward. There must also be free external ventilation. This warning is necessary because of the crowding that has gone on in nearly all our hospitals as a result of the war and the building of blast protection outside the windows. Because they have had no deadly infections spreading through such wards physicians, surgeons, and administrators without special experience have weakened on the importance of these things. A generation of students and nurses has gone out into the world brought up under these cramped conditions; and examples can easily be found of how those working in a hospital can become mentally immune to the insanitary conditions they have always been used to and take for granted. Dr. Wright's warning is salutary, and all the more so as she writes from one of the fever hospitals taken over from the old M.A.B. which have had practically the only wards in London run under proper hygienic conditions during the past five years.

With recommendation (*b*) we may also agree, not so much because of infection of the middle-ear cleft, which at this age is not dangerous and should be recoverable, but because of its devastating effect on the alimentary tract under 1 year of age. It is when we come to recommendation (*c*) that I begin to cross swords with her. As to (*d*), I have not worked in a ward submitted to the modern control of dust-borne infection, but I am sure it is necessary. With nearly the whole of recommendation (*e*) I disagree, except in so far as it describes the general principles of nursing carried out by every careful mother. Of recommendation (*f*) one would not complain, but I am in absolute opposition to recommendation (*g*), which I have known to do inestimable harm, and recommendation (*h*) is another subject.

The paper is an example of that pseudo-scientific type of medicine that is becoming so fashionable to-day, which looks only at the invisible invading organism and does not see the human being lying in the cot. It is a convincing piece of evidence in favour of that treatment of the child as a physiological unit which was developed in the 'twenties by many M.O.s of the M.A.B. when I was the first visiting consultant. It is regrettable that the misuse of isolation wards and the discovery of types of streptococci have prevented that treatment from being carried out with the same enthusiasm as it was in 1930, and I doubt whether the results of otitis media in acute infectious diseases are as good as they then were. It is, however, still carried out in its entirety at the Grove Hospital. Dr. McEntee has sent me his figures for the same period as that of Dr. Wright's paper—429 cases, of which 21 developed otitis media after the fifth day, an incidence of 4.9%. Not that statistics mean anything in these cases, except for one figure, and that is the number that are not well with a dry ear and normal hearing at the end of eight weeks from the day of discharge. At the Grove there was one doubtful case. Dr. Wright does not refer to this dominating date in otology, but she mentions another figure which is illuminating—18 mastoid operations were performed in 496 patients: at the Grove none. Leaving out those done for gastro-enteritis—a condition that was held to be an indication for a mastoid operation at that time—too many mastoids were being done either because of a fallacious plan of campaign or because of the timid interpretation of the indications for mastoidectomy. I suspect the former, though the six operations done in children under 2 are regrettable, for at this age the operation is seldom necessary.

The child as a physiological unit connotes three things that are germane to the subject. The erect position which admits of Eustachian drainage, movements of the muscles of the pharynx which stimulate this drainage, and activity which increases the circulation. This is the only way in which any influence can be exerted on the mucous membrane of the middle-ear cleft. The "ear treatment" is simply a toilet of the meatus. Treat the child and he will get well. When a roar of welcome greets the doctor or a nurse on their entry to the ward ears dry up; when all is "prunes and prisms" or the children under 2 are allowed only the exercise of their cots they will not.

We know that by the time the children are well enough to run about no harm comes from throwing them all together whatever the haemolytic streptococcus concerned. We learn that at the special ear clinic at the Southern Hospital, which is still an integral part of the organization for the treatment of otitis media in the fever service of the L.C.C., though it had temporarily to be shut down when preparations were begun for the E.M.S. We saw it at Joyce Green, where Dr. Mitman provided a ward for all the ear cases after the 21st day of discharge, during which he had them all isolated in the bed next to the doors of the ward. This was a reasonable compromise between the two schools. Every one of those cases got well and not one operation was performed. I know how harmful is "the procedure followed in bed-isolation wards," where the child is "restricted to his own bed area" and not allowed to associate with his little friends, because ears will not get well with that limited activity, and they hang on until the middle-ear cleft becomes infected by the skin organisms and chronicity results with its otitic morbidity and life-time risk of otitic mortality.

And now for recommendations (*e*) and (*h*). I doubt whether the modern nursing habit of pushing things into a baby's nose is good; certainly they should go no further than the inturned area of skin where "bogies" form. "Discard jars" should not be used; the scientific anti-cross-infection receiver is a small paper bag into which the pledgets and sticks are thrown, the mouth of the bag is then screwed up, and the whole thrown into the flames. These streptococci can only have touched the thumb and two fingers of each hand. Of course a nurse should wash her hands. Sterile wool is unnecessary; it is also harmful because the sterilization breaks up the fibres and the wool adheres less well to the sticks so that the mops are more likely to be left in the meatus. Of course bedpans should be cleaned, but these contain the organisms of the alimentary canal, not of the upper respiratory tract. Even in typhoid the organism in the ear is a haemolytic streptococcus. As to mugs, spoons, and forks being boiled, I agree as hospital equipment develops, but no one has come to any harm from them when they have been properly washed. The "no-touch" technique is not suitable for a mastoid wound. I have seen cases go wrong from a slavish adherence to a stereotyped technique. It is the patient's skin that matters, not the dresser's. Keep it dry and don't let skin touch skin where pinna and scalp meet. You cannot do that efficiently with two pairs of forceps. The child with his bed covered with toys and books is always a difficult one, but to deprive them of all toys and books is unkind. As one of my correspondents on this matter says: "You cannot put morale into a statistical table."

Barrier nursing I have already dealt with. There remains the question of sulphonamides. I think that every case of otitis media with discharge should be given a course of sulphonamide therapy. Not that it cures the otitis media, but it stops invasion in some cases where otherwise it would occur. But the nurse should not keep the patient from the upright position and activity longer than is essential. I do not agree with "claymore therapeutics," where time and time again the microbe is given hard hits that lay the patient low. In two cases it was suggested that an operation must be necessary because the drug did not cure the condition. The sister of the ward got the patient well in a few days by the method of physiological activity that she had learnt in the special ear clinic at the Southern Hospital.—I am, etc.,

T. B. LAYTON,
Palermo. Otologist to the London Fever Service, 1929-44.

Desert Treatment of Chronic Otorrhoea

SIR,—To the recent correspondence on the treatment of chronic otorrhoea might I submit another line of treatment. The high incidence of inflammatory and suppurative diseases of the ear, primary and recurrent, in the Middle East tempted me to try a completely new line of treatment, and the initial results have been almost dramatic. All the cases were treated at a field hospital in the desert under adverse conditions. The outline of treatment is as follows:

1. Auriscopic examination and the condition noted.
2. Irrigation of pus, debris, and wax in all types of cases, and whenever these are found, with solution of sodium bicarbonate 1 drachm to 1 pint of warm water.
3. The patient holds the auricle upwards, outwards, and backwards by extending his hand across the vertex in the usual way.
4. Hot air is blown into the meatus three times a day through an aural speculum by means of a Eustachian catheter heated over a spirit lamp, and pumping is supplied by a Politzer bag. Initially a dental hot-air syringe was used.
5. The air feels "cold" to the patient after 20 pumps of the bag on an average, and the patient is instructed to say "cold" when the air ceases to be warm.
6. I have employed 7×20 pumps three times a day, the whole procedure, including heating, taking from 3 to 5 minutes.
7. In cases with copious discharge and resistant to treatment hot air was also blown through the Eustachian tube via a catheter, but frequently in cases with large perforations of the drum the air when blown into the ear was felt by the patient to enter the nose.
8. Light plugs of wool inserted in the ear after each treatment.
9. It is advisable for the operator to wear a mask.

The chief points of interest found in the treatment were: (1) The majority of the patients took a keen interest in the treatment. (2) The rapid disappearance of pain in acute cases. Often the patients would come and ask for a treatment if pain recurred. (3) Favourable response in very chronic cases. (4) No medicaments are used; therefore the treatment is economical. (5) By means of a bath thermometer the estimated temperature (dry heat) obtained is roughly 200° F. (6) Many of the chronic patients remarked on the rapid disappearance of discharge and pain with this treatment as compared with previous treatments. (7) In several cases recent perforations actually disappeared. (8) The cases were not chosen ones, and where two ears were affected the more severe was treated by this method and the other with sulphonamide in glycerin (5%), and in these cases the hot-air treatment gave better results. (9) In no single case was there complaint of burning sensation during treatment. (10) Patients can easily be trained to carry out the hot-air part of the treatment on one another, and this was actually the practice in my department.—I am, etc.,

C. J. SCOTT,
Major, R.A.M.C.
Kent Aural and Ophthalmic Hospital, Maidstone.

War Neuroses after Psychological Trauma

SIR,—Air Commodore Gillespie's description of Freud's account of the traumatic neuroses (May 12, p. 653) cannot be allowed to pass without correction. In the first paragraph dealing with this subject he quotes from Freud's *Beyond the Pleasure Principle* (published 1920, translated 1922): "I think one may venture, tentatively, to regard the ordinary traumatic neurosis as the result of an extensive rupture of the barrier against stimuli." At this point the quotation marks are closed but he continues to quote verbatim: "In this way the old [naive] doctrine of 'shock' would come into its own again, apparently in opposition to a later and psychologically more pretentious view, which ascribes aetiological significance not to the effect of the mechanical force but to the fright and the menace to life." Here his quotation ends, but Freud goes on to say, "but these opposing views are not irreconcilable, and the psychoanalytic conception of the traumatic neurosis is far from being identical with the crudest form of the 'shock' theory." I can only quote Freud unabridged as it is so condensed. Air Commodore Gillespie's quotation of odd sentences from it, which comprises the next part of his paragraph, has changed the original meaning.

"While the latter [shock theory] takes the essential nature of the shock as residing in the direct injury to the molecular structure, or even to the histological structure, of the nervous elements, we seek to understand the effect of the shock by considering the breaking through of the barrier with which the psychic organ is provided against stimuli, and from the tasks with which this is thereby faced. Fright retains its meaning for us too. What conditions it is the failure of the mechanism of apprehension to make the proper preparation including the overcharging of the systems first receiving the stimulus. In consequence of this lower degree of charging these systems are hardly in a position to bind the oncoming masses of excitation, and the consequences of the breaking through of the protective barrier appear all the more easily. We thus find that the apprehensive preparation together with the overcharging of the receptive systems represents the last line of defence against stimuli. For a great number of traumata the difference between the unprepared systems and those prepared by overcharging may turn the scale as to the outcome: with a trauma beyond a certain strength such a difference may no longer be of any importance. When the dreams of patients suffering from traumatic neuroses so regularly take them back to the situation of the disaster they do not thereby, it is true, serve the purpose of wish fulfilment, the hallucinatory conjuring up of which has, under the domination of the pleasure principle, become the function of dreams. But we may assume that they thereby subserve another purpose, which must be fulfilled before the pleasure principle can begin its sway. These dreams are attempts at restoring control of the stimuli by developing apprehension, the pretermission of which caused the traumatic neurosis. They thus afford us an insight into a function of the psychic apparatus, which without contradicting the pleasure principle is nevertheless independent of it, and appears to be of earlier origin than the aim of attaining pleasure and avoiding pain."

Any question of paradox, "the greater the apprehension the less the likelihood of developing a traumatic neurosis," as suggested by Air Commodore Gillespie, is dispelled by this full quotation.

In the next paragraph headed "Simple Traumatic Neurosis" Air Commodore Gillespie states: "The central feature of the classical traumatic neurosis has been the recurrent dreams which recapitulate the traumatic event. Freud (1922) made it the point of departure for his observations on the repetition-compulsion phenomena." Continuing to quote from Freud where I left off: "This is therefore the moment to concede for the *first* time an exception to the principle that the dream is a wish fulfilment . . . they obey rather the repetition compulsion, which in analysis, it is true, is supported by the (not unconscious) wish to conjure up again what has been forgotten and repressed. Thus the function of the dream, viz., to do away with the motives leading to interruption of sleep by presenting wish fulfilments of the disturbing excitation, would not be its original one; the dream could secure control of this function only after the whole psychic life had accepted the domination of the pleasure principle." So the dream by its development of apprehension can be regarded as a method of repetition compulsion to deal with the intruding stimuli. Freud discusses repetition compulsion in a paper (1919): "We are able to postulate the principle of a repetition compulsion in the unconscious mind, based upon instinctual activity and probably inherent in the very nature of the instincts—a principle powerful enough to overrule the pleasure principle, lending to certain aspects of the mind their daemonic character and still very clearly expressed in the tendencies of small children." In *Beyond the Pleasure Principle* he further elaborates his views on the subject, and demonstrates the part it plays in mastering painful experiences. Then he modifies his views on the dream as a wish fulfilment to bring them into line with this new discovery. (*Vide* quotation above.) Air Commodore Gillespie then continues: "It would not invalidate his [Freud's] speculation on repetition if this kind of dream were to be found to depend not on disturbance of the organization of the ego but on more primitive properties." As I have just shown Freud does consider repetition compulsion to belong to that borderland between physiology and psychology—i.e., the instincts. With regard to the traumatic dream itself, its outstanding characteristic is its exact photographic-like reproduction of the actual happening and is in no way whatsoever the result of any ego elaboration; this in itself places the dream in a different category to those of the pleasure principle, which are essentially ego elaborations, and, as Freud has shown (in my quotation above), are the result of disturbances in the ego. Air Commodore Gillespie goes on to say, "This type of dream may be regarded *instead* [italics mine] as a preservative phenomenon at the physiological level." If instincts belong to physiology then this is exactly the argument which Freud advanced in *Beyond the Pleasure Principle*, and is generally accepted as a true statement by psychoanalysts.—I am, etc.,

D. N. HARDCASTLE.
Bishop's Stortford.

Ovariotomy or Caesarean Section?

SIR,—I desire to express my gratitude for the sage and humane counsel of Mr. Victor Bonney (March 31, p. 459) and for Prof. S. J. Cameron's example (March 3, p. 307) of how to section a patient in bed when circumstances demand it.

Mr. McIntosh Marshall (March 24, p. 421) is one of the pioneer exponents of local analgesia for Caesarean section. My regret is that I did not follow his lead sooner. Local analgesia is undoubtedly ideal. The relaxation of the abdominal wall permits one to discard retractors. The uterus contracts and retracts so beautifully that I am persuaded the blood loss is less than for normal delivery. I find that I have barely time to clear the mucus from the throat of the infant, which is usually born with its eyes wide open, and lay it between the legs of the mother before the placenta presents itself in the wound. Child and placenta together are handed to the nurse with instructions not to sever the cord until pulsations cease. This may be accomplished, using 1 in 2,000 nupercaine solution, by bilaterally blocking thoracic nerves 8, 9, 10, 11, and 12 each with 7 to 10 c.cm. anaesthetic solution and infiltrating 10 c.cm. around each iliohypogastric nerve in its course through the internal oblique muscle from 3 to 4 cm. above to 2 cm. medial to the anterior superior iliac spine. When the abdominal cavity is open 5 c.cm. of the solution is infiltrated on each side of the bladder into the extraperitoneal tissue and 10 c.cm. beneath the peritoneum in the vesico-uterine excavation. To prevent the parturient being distressed by the theatre display, needle pricks, etc., she is given a subcutaneous injection of 15 mg. omnopon or morphine before the operation (2½ hours for preference, if time permits), and on the table she is kept from moving her limbs by the very lightest chloroform or vinesthene narcosis. Before she leaves the table the mother is shown her baby, and on her return to the ward she is given a cup of tea or ovaltine as she prefers, turned into Sims's posture, and so to sleep.

Post-operative nausea and headache are abolished and the improved well-being of the mother is very evident. Nupercaine is boilable and does not inhibit the action of the sulpha drugs—an important matter when operating on a patient whose membranes may have been ruptured for 24 hours, and who may have been examined repeatedly by unclean native midwives before admission to hospital. I would never revert to other types of anaesthesia except at the express desire of a patient or where a suitable local analgesic agent is unobtainable.—I am, etc.,

Poona. F. R. W. KINKEAD ALLEN.

Women in Labour

SIR,—I have read the correspondence of Dr. Elam and others in your recent issues with great interest. It is yet another incident in the "ever-since-Simpson" controversy upon anaesthesia and labour. Dr. Violet Russell mentioned my name in her contribution on April 28, and I am constrained to comment, apologetically, as my remarks may be considered to be irrelevant and her reference to my work misunderstood.

It appears that the general consensus is that an anaesthetic must be given in labour or woman suffers unbearable pain. The assumption that normal labour is painful is erroneous. Surely painful labour is abnormal, or must we admit that the human race in order to survive is subjected to pathological adventure? Do scientific and biologically minded men, even though they may have no particular philosophy, really accept without question that the most desirable experiences of a woman's life, and her obvious natural urges, are rewarded in their ultimate perfection by an ordeal of pain and danger?

It remains a fact, however, that labour is painful in the large majority of cases, particularly those attended by members of the medical profession. In the absence of primary physical abnormality, painful labours are due to abnormal emotional states. The pain–fear–tension syndrome and its physical manifestations cannot be fully discussed here, but I seriously urge obstetricians to inquire into this matter. The factors concerned with interpretation and intensification of sensory stimuli are important, because the mechanism of dilatation and expulsion depends upon them for their integrity.

The emotional states of a woman in labour have variations within normal limits without disturbing neuromuscular harmony or polarity. They are constant and amenable to care and treatment. Controlled emotional influences dispense with both the desire and the desirability for anaesthesia. Natural childbirth is not only free from unbearable discomfort, but attended by a pleasing and satisfying sense of accomplishment—a reward of which many women do not wish to be robbed by enforced unconsciousness. There are hundreds—probably thousands—of women in this country who can testify to the truth of this statement, but they remain silent because they are happy in their own experience, and have no desire to be called lunatics or liars by acquaintances who have themselves been allowed to suffer.

As I have written elsewhere: "It must be recognized that if and when emotional manifestations are abnormal, parturition becomes pathological, and requires treatment by scientific means as expeditiously as an obstructed labour. It is a serious complication, and one of the major causes of maternal morbidity."

Anaesthetic must always be available and ready for use. We all should use it when pain threatens, but once natural painless labour has been witnessed without prejudice, anaesthesia becomes an emergency or adjuvant, instead of an adopted routine, for pain is recognized and treated as an abnormality. The difficulties that have strewn the path of this teaching are almost unbelievable when such a prize is at stake as the abolition of the fear of childbirth. But we are a conservative profession, and demand numbers, statistics, and controls before accepting innovations contrary to orthodoxy.

Students have only recently been instructed in the emotional influences of pregnancy, and their curriculum must conform to the requirements of examiners. I recently had the privilege of visiting a number of the universities in the British Isles, and found that, with few exceptions, the organizations and structure of the maternity teaching hospitals make educational changes difficult, and until these obstacles can be overcome we must expect painful labour and the general use of anaesthetics.—I am, etc.,

Woking. GRANTLY DICK READ.

SIR,—I have read the letter by Mr. John Hamilton (May 19, p. 714) with interest. The psychological aspects of childbirth and its related processes, such as lactation, have been largely ignored and the average labour is by no means necessarily a normal one. I agree with Mr. Hamilton's recommendation that the suggestive word "pain" would be better replaced by the innocuous term "contraction." Furthermore, the relieving of muscular tensions would help to attain "a calm conduct of the ante-natal period" and of the labour itself. This subject has been described in detail by Jacobson (*Progressive Relaxation*, 1938) and has been used in pregnancy and parturition by Grantly Dick Read (*Revelation of Childbirth*, 1942). I would add that this method has also been found useful in hypertension and for sleeplessness, and might have been mentioned with advantage in the reply to the question on insomnia (p. 721).

Too little attention is paid to the psychological aspects of general anaesthesia also. I have known hospital sisters to enter the theatre with a cry of "Nurse! You've forgotten to bring the vomit bowl," while I have been attempting a peaceful induction.—I am, etc.,

Sheffield. R. O'RAHILLY.

Infant Deaths

SIR,—The letter of Dr. T. B. Sellors (April 28, p. 607) contains the fantastic suggestion that "swaddling" is necessary in order to restrict a baby's natural movements "to ensure rest which is one of the essential needs of early animal life." Why should the human infant be subjected to such maltreatment? Newly born lambs and other very young animals are bursting with energy and require no swaddling or binding to restrict their healthy and vigorous movements. Nature makes provision for some freedom of movement before birth by floating the child in liquor amnii. Abdominal paracentesis of the pregnant uterus has been shown to be practical for certain radiological investigations, so why not interfere still further with Nature and perform a paracentesis regularly during pregnancy and drain off liquor so that the uterine muscle can caress and "swaddle" and inhibit the movements of the growing babe?

Dr. Sellors's reference to swaddling as "a universal custom from time immemorial" set me searching for references in many obstetric textbooks and books on paediatrics both British and American, but with no success. That massive work on *Woman* by Ploss and Bartel made no reference to the care of the baby. I had no success with the *Encyclopaedia Britannica*, but the *New-Born Baby* by Dr. Eric Pritchard proved of great interest and gave quotations well worthy of repetition.

Dr. Pritchard refers to infants' clothing which "fulfils the necessary conditions of comfort, warmth, economy, cleanliness, facility for free movement, and skin activities." There is a delightful chapter on nursery fallacies. He says: "Many of the most egregious nursery practices find their sanction in antiquity, and owe their perpetuation to the conservative adhesion to authority which is shown by even the greatest of the masters of medicine . . . who, each in turn, followed blindly in the footsteps of his predecessors." He quotes from Dr. George Still's work on the *History of Paediatrics*, which I have not seen:

"First as regards binders. These monstrous inventions, which in modified and mitigated form have survived until the present day, originated in the dark periods of medicine when 'swaddling' along with 'salting' was regarded as an essential part of the hygienic ritual of the newborn (Galen, A.D. 130)." In 1472 Paolo Bagellardo "gave full details of the method of binding up the arms, body, and legs of newborn babies, so that the child might be properly shaped . . . to the end that the baby should not become a hunchback, but be properly pressed into shape." He quotes Mauriceau (1668): "Let his [the baby's] Arms and Legs be wrapped in his bed and stretched strait and swathed to keep them so, viz., his Arms along his sides and his Legs equally both together with a little of the bed between them that so they may not be galled by rubbing one another: after all this the Head must be kept steady and strait with a stay fastned on each side the Blancket, and then wrap the Child up in Mantles or Blanckets to keep it warm. He must be thus swaddled to give his little body a strait Figure, which is most decent and convenient for a Man and to accustom him to keep upon the Feet, for else he would go upon all four as most other Animals do." Again he quotes the English physician, William Cadogan, who wrote in 1748: "The first great mistake is that they think a newborn infant cannot be kept too warm: from this Prejudice they load it and bind in with Flannels, Wrappers, Swathes, Stays, etc., commonly called Cloaths, which altogether are almost equal to its own Weight." John Cooke, another Englishman, wrote in 1769; "If they were not swathed, but allowed as much freedom as puppies, it would be much better for them, as I have shown in former discourses on the cause of the surprising mortality of infants under two years of age." Dr. Pritchard finishes this section with the comment: "Binders, long clothing, tight shawls and other impediments to free movement, by hampering muscular action, delay the general development of the body as a whole, encourage weak backs, spinal curvatures, and pot belly, and by restricting the expansion of the abdomen predispose to inguinal hernias."

No doubt the Association of Maternity and Child Welfare Centres has done much to rationalize clothing for the newborn baby, but all this can be of little benefit if a final firm blanket is securely wrapped and fixed to immobilize the hapless infant. In my experience it usually is a firm blanket and not a loosely knitted shawl lightly applied. No one suggests that the object of this tight wrapping is to deform the child, as in producing the tiny foot of a Chinese lady or the distorted skull of the Incas; the reason, I am told, is to prevent thumb-sucking. What a penalty!

Before writing my original letter (April 14, p. 529) I made certain inquiries which lead me to believe that tight wrapping was "widespread" and not merely a local atrocity which had come under my notice. Dr. Sellors's letter is mostly irrelevant and he endeavours to side-track the issue, but I am more than ever impressed with the extreme importance of this matter. Several national and provincial papers printed extracts under such headings as "Babies Tucked up too Tightly," and although this publicity has not improved the cordiality of certain members of the nursing profession toward me I believe some little good has been achieved. John Cooke's observation quoted above is worthy of special note.

I hope paediatricians whose status will command respect will make some definite pronouncement if their experience is similar to mine, and that many doctors who are competent to judge will play their part in investigating my "mischievous belief" and helping to prevent further waste of life.—I am, etc.,

Huddersfield. S. H. WADDY.

Bread and the Bowels

SIR,—The *Journal* of March 17 has just reached me and I was interested to read the report of the Nutrition Society on bread (p. 379). For the past five years my family and I have been stationed in the centre of India at a railway junction. Owing to the absence or high price of imported (and transported) goods, we have been compelled to eat those foods which are grown in the district. The grain, vegetables, pulses, fruit, etc., mostly come to us from within a radius of 50 miles or so. The basic diet of the district is wheat, dal (lentils), spinach, to which for the more wealthy may be added milk, butter-fat, and rice.

It has been our custom to buy a bag of wheat at harvest-time, and from this during the ensuing year quantities are taken as required and ground in the local "punchukki." The flour so obtained is made into leavened wholemeal bread or into chuppatties. A special hard wheat is also used to make a very palatable porridge. The flour obtained from the "punchukki" is 100% extraction, and from this the cook picks out the coarser particles but no more. This high-extraction wheat flour, then, has been the basic diet for us and our children for the past 5 years, and we consider that it has been on the whole very beneficial. Its most obvious and rapid effect has been on the bowels: two normal movements a day (except perhaps in the hottest weather) have been the rule as with the healthy Indians around us (an Indian who gets only one movement a day usually considers himself to be rather constipated).

For those liable to diarrhoea (convalescence after dysentery) and perhaps in some children under 2 years this high-extraction flour may be too coarse. For a healthy adult I would suggest that the best form of wheat for the table was a well-made fresh chuppatty with butter—better than white bread for the general health, perhaps better than leavened bread for the teeth, and having with butter a pleasant enough taste to make jam unnecessary. However, Britain will never adopt chuppatties, and in any case the "double roti" saves the housewife considerable trouble and time.

The first important point I would like to make is that I believe (correct me if I am wrong) that in these coarse diet, wheat-eating areas of India duodenal and gastric ulcer, appendicitis, etc., are fairly uncommon (in spite of the chillies). I think you would find cancer of the stomach also low, but as I have no statistics before me I will not press the point. The second point is that I believe if given the choice the vast majority of the British people would choose white bread to brown; they certainly would have done pre-war. As a vehicle for jam white bread is very pleasant. The third point is that unless bacon and eggs are as good for the bowels as high-extraction wheat flour what is lost upon the roundabouts by milling is not gained upon the swings by eating eggs and bacon. The fourth point is that with the coming of peace, and the availability again of large amounts of jam, chocolate, lollypops, and other kinds of sweets, wholemeal bread will be more, not less, necessary for the health of the population.—I am, etc.,

Itarsi, C.P., India. M. L.

"Bread—Defeat and Victory"

SIR,—Sir Ernest Graham-Little (May 26, p. 750) writes, ". . . it may profitably be noted that Russian soldiers have won their resounding victories on a diet mainly composed of whole-grain bread." Our gallant ally Soviet Russia first retreated then advanced on whole-grain bread. Our enemy Germany, on the same bread, as a corollary, first advanced then retreated. With such perfectly controlled experiments, it is difficult to see why Sir Ernest should consider there is a causal relationship between "intake of bran" and "output of victories."—I am, etc.,

London, W.1. J. DOUGLAS ROBERTSON.

Chlorine Inhalation for the Common Cold

SIR,—Some years ago I was impressed by two patients who accidentally inhaled chlorine while suffering from colds, and whose colds promptly recovered. I found that I could invariably abort my own colds by inhaling small quantities of chlorine gas, and, in fact, have not had a cold since I adopted this method two years ago. But I was doubtful if the mucous membrane would stand the insult. However, after being re-

reassured by an eminent laryngologist that ciliated epithelium could regenerate in four days, I decided to try chlorine as a cold cure among the workers in a small factory engaged on important war work, where absenteeism from colds interfered with production.

The method adopted has been to add 30 minims of HCl fort. to about 2 drachms of pot. chlorate in a dry 8-oz. bottle, allow to stand stoppered for 15 minutes, and add water gradually to dissolve the chlorine. The victim is persuaded to attend the first-aid room once an hour, when the unstoppered bottle is held under his nose, and he must sniff sufficiently hard to make him cough. On the first occasion he is given 5 grains of aspirin and a tablet of benzedrine to clear his head.

All those who volunteered to be treated in this way were sufficiently relieved to continue the treatment with enthusiasm. None took longer than three days to cure; most took one or, at most, two days. In January, February, and March this year 62 people with colds were so treated, and between them lost only one day's work. The sceptics, who did not attend, in some cases stayed at work with their colds, but 13 people stayed away, sending medical certificates that they had colds, and between them they lost 44 days of work. The total population at risk averaged 225. I have had no complications, such as sinus infection or bronchitis, in any of the treated cases.—I am, etc.,

Ashtead. W. EDWARDS.

Sulphonamides in Pus

SIR,—It seems to be a generally accepted clinical rule that sulphonamides are inactive in the presence of pus. (Local treatment [of otitis media] by sulphonamides is irrational because . . . the drug . . . is inactivated by pus (*Journal*, April 29, p. 617). In October, 1944, we were anxious to obtain a culture of the gonococcus to make antigen for the complement-fixation test. We chose—for culture on citrated rabbit's blood agar—urethral pus containing many gonococci, demonstrable by Gram-stained smears, showing a minimum of contaminating bacteria, and taken from recently infected persons on their first diagnostic visit. All our cultures were negative. We made a number of attempts, using media in triplicate, but to no effect. In spite of the well-known difficulty of growing gonococci these results were so different from our previous experience that we made inquiries as to the nature of any treatment undergone by the patients before we had seen them. We found that they had all been taking sulphathiazole—6 g. a day for twenty-four hours—before attending the laboratory. After learning this we treated our media with procaine (novocain)—para-aminobenzoic acid being unobtainable—and then found that our media supported the growth of gonococci, even though the patients continued as before with their sulphonamides.

It is claimed that this experience demonstrates the effectiveness of a sulphonamide even in the presence of pus, since the sulphonamide present as a contaminant in the pus prevented growth of susceptible organisms until neutralized by a P.A.B. substitute.

One of my assistants—Mr. A. Hodgson, F.I.M.L.T.—suggested this use of procaine.—I am, etc.,

FRANK MARSH.

Artificial Respiration

SIR,—May I reply tersely to three recent criticisms in your columns?

(1) I had stated, "I am permitted to say that the proportion of successful resuscitations in the Royal Navy has increased since the rocking method was adopted." To this the Royal Life Saving Society replied (April 28, p. 618): ". . . we are given to understand on good authority that rocking methods are not being used in the Navy." Needless to say I could not have made this public statement unless the information was authentic and official: this has subsequently been confirmed.

(2) Dr. Clark Noble (May 5, p. 643) fails to see my point that—in a toneless victim lying prone in Schäfer's or the rocking methods—the upward thrust of the ground (or stretcher) immobilizes the ribs and anterior abdomen so that artificial respiration is effected almost only by the piston action of the diaphragm. (Anyone can feel the truth of this by lying prone on the floor.) Hence, if with approaching death in asphyxia the diaphragm also loses tone, Schäfer's method would be ineffective but the rocking method unimpaired. Dr. Noble concludes by saying that Schäfer's method is the most satisfactory. Yet surely he has read that in all the recent quantitative tests Schäfer's method has taken the last place, not the first

(3) Surg. Rear-Adml. Cecil Wakeley (May 19, p. 712) quotes two distressing cases in which underwater explosion had caused perforations in the bowels. He blames the rocking method for causing wide escape of faeces, making operation hopeless. But what were the poor first-aiders on the rescue trawler to do? If breathing had stopped, death would quickly follow unless they promptly started artificial respiration. Schäfer's method would have been as bad as rocking in forcing faecal material through perforations, perhaps worse. Silvester's method is not admissible in blast cases because the lungs may be injured. Mouth-to-mouth inflation is the only harmless method in blast, but this is rarely taught (except for newborn babies) and the admiral omits to suggest it. Hence these two cases are not evidence that rocking has more contraindications than Schäfer's method; the reverse opinion is generally held.

The menace of the present situation (revealed in all three letters) is the false but tempting doctrine that Schäfer's method is invariably the best and all-sufficing. This saves instructors and administrators much thought and trouble but prevents all progress. Thank goodness, the Royal Navy in 1942 had the courage to point out the imperfections and bad overall results of Schäfer's method (though useful when single-handed or as a prompt preliminary to rocking). Ever since they have acted as pioneers towards more effective methods. For this great task they have the finest facilities—teachers and taught and rocking devices in the same ship. The aid of this *Journal* has also been invaluable though impartial.—I am, etc.,

Hull. FRANK C. EVE, M.D., F.R.C.P.

PS.—Prof. R. R. Macintosh (May 26, p. 747) considers that, as regards pulmonary ventilation, any method if given efficiently will probably suffice unless the patient is already dead. But this omits the great factor of circulation, which may decide the issue and in which the rocking method has shown its superiority both experimentally and theoretically. And obviously, no one could tell whether a border-line case was already dead (i.e., unrevivable) unless the *best* method had been tried properly and failed.—F. C. E.

The Child's Acquisition of Speech

SIR,—In her article on the child's acquisition of speech (May 19, p. 707) Dr. Mary Sheridan refers to so many sources of information besides her own interesting observations that it is all the more disappointing that in her closing remarks on "speech therapy" she leaves the reader with the impression that failure in the development of speech in the young child only needs investigation from the point of view of mental retardation or organic hearing defect. Not infrequently, however, it is conditioned by emotional conflict. There may be no hearing defect, and speech therapy is in some cases found to be useless or inadvisable before the emotional difficulty has been adjusted.

In the case of a 4-year-old boy under my care with gross emotional disturbance, speech is returning parallel with resolution of the emotional conflict.—I am, etc.,

London, W.14. J. E. MACKWORTH.

Final M.B. of London University

SIR,—There are people who consider that by allowing a candidate to take the final M.B. in separate parts the standard is lowered. After a long experience as an examiner, I am convinced the opposite is the case. When a candidate is obliged to take the two parts together and does well in one subject the examiners in the other subject (who are always humane) are liable to be persuaded to let him through the second subject, although he is definitely below standard.

It is true that some candidates find it easier to attain the high standard of the M.B. by taking the parts separately, but is there really anybody against this, provided that he does reach that standard? I can find no evidence that a candidate who takes the parts separately will forget what he has learnt any quicker.—I am, etc.,

London, W.1. MALCOLM DONALDSON.

Housing the Returned Consultant

SIR,—There are a few of us, now well advanced in the fifth decade of life, who in September, 1939, when we joined the Army uninvited, were serving on the honorary staffs of one or more of the London teaching hospitals. By virtue of our age and military service we have been led to hope for release from the Army in the near future. Our only means of living, before being caught in the net of a State medical service, is to subsist on the scanty ruins of our pre-war practices. Both custom and necessity urge us towards that citadel of consultants (and others) situated between Oxford Street and Marylebone Road. I am informed by a number of house agents who operate this area that consulting-rooms and living accommodation are impossible to obtain, and that for some rooms there is a long waiting list. One agent said despairingly, "There is Major-Gen. —— a major-general, no less, coming home and we have nowhere to put him." So there would seem to be little hope for those of us of slave rank. Rents are fantastic and Central Europeans abound in this chosen land. Perhaps eventually there may be an exodus of these foreign bodies directed by persuasion or compulsion to meet the medical needs of Germany, with which the R.A.M.C. are now contending. Many of us hope this may be so.

In the meantime could it be suggested to some benevolent medical body that a few houses be requisitioned for ex-Service consultants and specialists where rooms could be let at reasonable rents in which we could see our few patients and enjoy a sense of liberty and professional independence, at least for a time. The alternative seems to be to acquire a Nissen hut in the wastes of Regent's Park.—I am, etc.,

H. B. STALLARD, M.D., F.R.C.S.,
Major, R.A.M.C. (T.A.).

B.L.A.

Indications for Adrenalectomy

SIR,—In your issue of May 19 two cases are recorded of adrenal virilism associated with mental changes treated by adrenalectomy. The first case (Clifford Allen and Broster, p. 696) showed a progressive schizophrenic psychosis and increased body hair growth with a "thick down" on cheeks, chin, and upper lip. There is no mention of the fact that the hirsutism was especially disfiguring or that the patient herself was sensitive of her appearance, and, indeed, if I interpreted the paper correctly, the psychosis and not the adrenal virilism was the main indication for adrenalectomy. The second case (Raymond Greene, Paterson, and Pile, p. 698) showed mental symptoms described as a "tense hypochondria," for the development of which there would seem to have been adequate domestic reasons, such as an alcoholic husband, an invalid mother suffering from hysterical fits, and a son whose asthmatic attacks often disturbed his mother's sleep. Subsequently acne and an inordinate growth of hair appeared. In this case the primary indications for adrenalectomy seem to have been the adrenal virilism, the rise in 17-ketosteroid excretion from 21 to 33.8 mg. a day, and the fact that a second perirenal insufflation gave an illusory appearance of increase in size of the left adrenal. In both cases removal of a normal-sized adrenal gland led to disappearance of the mental symptoms and improvement in regard to the hirsutism—"her hair could be easily pulled out" (Allen and Broster); gradual disappearance of the facial hair which had not been shaved, and no sign of further hair growth either on the shaven or unshaven areas (Greene *et al.*).

The publication of these two reports raises the question of the indications for adrenalectomy. Everyone would agree that in the presence of good evidence for the existence of an adrenal cortical tumour (such as palpation or visualization of the tumour, or an elevation of the 17-ketosteroid excretion to the region of 100 mg. a day) removal is essential and is usually followed by the disappearance of the virilizing features.

The indications for the removal of a normal-sized adrenal gland, however, are open to argument. It would, I think, be the opinion of those who have had experience of the treatment of superfluous hair in women that such an operation does not usually result in the cessation of growth of the offending hair. Indeed this impression is borne out by Broster himself, and he is undoubtedly the most distinguished exponent of adrenalectomy in this country. In his book *The Adrenal Cortex and Intersexuality* 28 cases of hirsutism without adrenal cortical tumour in which he has performed unilateral adrenalectomy are tabulated. Of the 10 cases in which the condition of hair growth at "follow-up" 4 months or more after operation is recorded, one only was apparently completely cured ("face free from hair" 9 months after operation). In the other 9 depilation was still necessary, though the hair "comes out easily." It would appear, therefore, that hirsutism by itself is not an adequate indication for removal of a normal-sized adrenal.

An elevated 17-ketosteroid excretion has been referred to in both the papers under discussion. At present, however, not enough is known about the normal range of 17-ketosteroid excretion to justify drawing conclusions as to the significance of values in the region of 30–40 mg., other than that they suggest that the adrenal glands are more active than normal—a suspicion which the hirsutism itself will have already established.

The pitfalls of perirenal insufflation, a procedure not completely devoid of risk, are brought out by the experience of Raymond Greene and his colleagues. Either this method of visualizing an enlarged adrenal or evidence of displacement of the kidney as provided by intravenous pyelography may, however, greatly assist in locating a suspected tumour after a very high 17-ketosteroid excretion has shown its existence to be likely.

There remain, therefore, only the psychological changes to be discussed as an adequate indication for unilateral adrenalectomy. Allen and Broster in their paper point out that they are recording the fourth case of schizophrenic psychosis associated with adrenal virilism, and that adrenalectomy should always be considered in this rare syndrome. Allen goes further, and indicates (in Broster's book) that many cases of adrenal virilism are associated with "abnormal sexuality" (e.g., autosexuality or homosexuality), and claims that "correction of the adrenal factor may lead to the restoration of normality." It may, therefore, be that adrenalectomy may come to be used as yet another heroic method of psychiatric treatment (like prefrontal leucotomy), concerning the justification for which I am quite unqualified to express an opinion.

Let us, however, be clear about one thing, and this is not stressed either in Allen and Broster's paper or in that of Greene and others—namely, that there is at the moment no evidence to show that removal of one normal-sized adrenal gland is justified in a woman with superfluous hair who does not show an "abnormal sexuality," a schizophrenic psychosis, or a "tense hypochondria."—I am, etc.,

London, S.E.1. P. M. F. BISHOP.

The Services

Col. (Acting) G. M. Warrack, R.A.M.C., has been awarded the D.S.O., and Capt. (Temp.) B. C. Montague, R.A.M.C., the M.C., in recognition of gallant and distinguished services in North-West Europe.

Capt. H. A. Cole, R.A.M.C., and Capts. M. Lerner and S. Worobetz, R.C.A.M.C., have been awarded the M.C. in recognition of gallant and distinguished services in Italy.

Capts. A. C. V. Jones and E. H. Williams, R.A.M.C., have been awarded the M.C. in recognition of gallant and distinguished services in Burma.

Safe and well in Rangoon.—Lieut.-Col. (Acting Colonel) K. P. MacKenzie, R.A.M.C.

CASUALTIES IN THE MEDICAL SERVICES

Killed in action.—Capt. William Donald Wilson, R.A.M.C.

Wounded.—Lieut.-Col. G. E. Ord; Major B. McN. Truscott; Capts. J. W. Macmillan, M.C., H. R. Thomson, and W. H. McN. Wilson; War Subs. Capts. L. E. S. Coghlan, C. K. Hirson, G. Houseman, and H. M. Jones, M.C.; and Lieut. H. Holden, R.A.M.C.

Acting Squad. Ldr. JOHN NORMAN WILLIAMS died on May 10 of injuries received in an accident in N.W. Europe. He was born in May, 1915, studied medicine at Guy's Hospital, and qualified M.R.C.S., L.R.C.P. in 1939. He held house appointments at Belgrave Hospital, the Seamen's Hospital, Greenwich, and King George's Sanatorium, Liphook, and was appointed to a commission in the Medical Branch, R.A.F.V.R., in May, 1941.

Obituary

H. E. DUNNING GALE, M.B., B.S.

Surg. Lieut. Dunning Gale ended his life, aged 35, as a Marine Commando in the bitter struggle on the beaches of Dieppe in August, 1942. For over two years he was posted as missing, and news of his death has only recently come in.

Born in Monmouthshire on April 26, 1907, the preparatory school to which his parents sent him played a large part in shaping his career, for the family fortunes were in a poor way at that time and the headmaster took upon himself the education of two of the three Gale boys by coaching them privately before and after they had left his school. Fifteen years later, when Dunning was discussing his work as a doctor, he would seldom forget this debt that he owed to his old headmaster, Frank Barton.

Gale entered Bart's in April, 1927, and from the first his keenness for the scientific and laboratory side of medicine was apparent. In 1934 he was doing original work with Graham Weddell on changes in the blood-sugar level associated with surgical operations; work that was published, soon after he qualified, in the *British Journal of Surgery*. During his appointments as casualty house-physician at Bart's, and as house-physician to George Graham, his tough and stocky figure was well known about the hospital. With Graham he found he could blend his love for the laboratory with his interest in clinical medicine, and many were the nights one can remember when he was doing blood-sugar estimations long after the other residents were in bed. This was one of the happiest years of his life. His heart was in research, and for this his enthusiasm, patience, and thoroughness stood him in good stead. Under the late Prof. H. H. Woollard, F.R.S., and Prof. W. J. Hamilton, Gale at first enjoyed his anatomical work as demonstrator. He liked teaching and he was a good draughtsman. Prof. Hamilton writes: "In the transfer of the anatomy department from the hospital side to the new department in Charterhouse Square, Gale gave valuable service. In spite of heavy teaching duties in the department he found time to do research. He was particularly interested in tissue culture and had made progress in the developing of a technique for the growth of nerves *in vitro*. I always found him to be a very helpful and loyal colleague, ready and willing to give of his best. By his untimely death the medical profession has lost a young man of great ability and promise." After three years in the anatomy department Gale found that "teaching was not enough." His heart was in medicine, in his biochemical laboratory, and in clinical research; and in September, 1938, he resigned his appointment as demonstrator, and to everyone's surprise, except those who knew him well, he put his plate up in general practice in Bolton Gardens, S.W.10. Here, once more, he was happy. In a few months he equipped a clinical laboratory that was the envy of his colleagues, and in one short year he must have done more first-class clinical biochemical work than has ever been done before by a general practitioner. Single-handed, he carried out blood-urea, alkali-reserve, blood-sugar, and serum-protein estimations, urea clearance tests, and many others, often working at them late at night, on top of all the manifold tasks demanded of him by a busy panel and private practice. His patients recognized at once that here was a young doctor out of the ordinary, with a good training, with modern ideas, and with first-class equipment, and many came to seek his advice. Those of us who were privileged to look after these patients when Dunning Gale was away, or after he had joined the Navy, knew what his patients thought about him, and about his keenness to give even the most humble of them—in their homes—the best that modern medical science could offer. It was his ambition to show that many uncomplicated laboratory investigations not only could but should be carried out by the practitioner himself. He believed that the future of medical practice lay in the more fully trained practitioner investigating fewer patients more thoroughly.

Gale joined the R.N.V.R. in 1940. He was stationed on the South Coast during the Battle of Britain, and at this time he often used his car to rush to crashed machines, or to the aid of pilots who had baled out. Many times he was the first on the spot. When the call came for volunteers for the Marine Commandos, Gale offered his services, and so he came to be on the Dieppe raid. We are told by a comrade (who was, until recently, a prisoner of war) that, at the height of the fighting on the beach, Gale had a chance of getting back but he decided to stay with his wounded. Later he ran out from cover across a fire-swept beach to some wounded Canadians at the edge of the water, and there he met his gallant death. Of him we shall remember most clearly his enthusiasm in his professional work, his ready laugh, his deft fingers and fondness for "gadgets," his laboratory with its shelves of bottles, his microscope, his scientific outlook, and his loyalty to his friends. There are many who will feel in his death a particular loss.

J. H. H.

Dr. ELLIOTT BEVERLEY STEEDS-BIRD, well known as a radiologist in the Portsmouth area, died at Southsea on May 16, aged 64. He was educated at Cheltenham College and Trinity College, Dublin, qualifying L.R.C.P.&S.I. in 1903. After holding resident posts in Dublin he obtained the L.M. of the Rotunda Hospital in 1907. He served throughout the last war, was mentioned in dispatches four times, and received the D.S.O. in 1917 and the Territorial Decoration, and the Croix de Guerre Française, retiring with the rank of lieut.-colonel, R.A.M.C. He was proud of the fact that he went to France with the first Territorial contingent and was the first Territorial M.O. to command a regular field ambulance. Before his appointment as honorary radiologist to the Royal Portsmouth Hospital and the War Memorial Hospital, Gosport, Dr. Steeds-Bird had held the same post at the Royal West Sussex Hospital; he was also consultant radiologist to the Petersfield and Emsworth Cottage Hospitals. He joined the B.M.A. in 1910, was secretary of the Section of Radiology and Electrology at the Portsmouth Meeting of 1923, and was elected a Fellow of the Faculty of Radiologists in 1939. His principal recreation was sailing, and he belonged to the Royal Albert Yacht Club, Southsea, and the Royal Portsmouth Corinthian Yacht Club. Gardening and mechanics were also pursuits he enjoyed in his scanty leisure time. By his death the medical profession in Portsmouth has suffered a severe loss. His colleagues looked upon him as a true friend to whom they could always turn in trouble. During the war he was greatly overworked, owing to the absence of one of his partners in one of the Services and the enormous strain of extra duty among casualties both before and after D-day. A partner writes: Close personal and professional association with Beverley Steeds-Bird has been a great and rare privilege. Recent anxious and difficult years illuminated by his courage and comradeship became a precious experience, not to be missed, leaving happy memories. His never-failing sense of fun did much to lighten heavy work, and at times made even air raids almost enjoyable. Though one saw him every day, he never left the house but that one found oneself looking forward to his return. It has been easy to understand why he had a distinguished record as a soldier in the last war; easy to see why the nurses in his department at the hospital looked forward to his visits. It will not be easy to fill the gap caused by his departure.

Dr. ROBERT STEWART PARK, of Grove House, Paddock, Huddersfield, died with painful suddenness on May 13 while on a fishing holiday at Masham in North Yorkshire. Qualifying in 1908 at St. Andrews, he had been in practice for a few years at Silloth, interrupted by war service, and then in 1919 he settled in Huddersfield, where he speedily gathered a large circle of patients and conducted a very successful practice for 25 years. Although he took no part in public life, he was chairman of the Huddersfield Local Medical and Panel Committee for 13 years and on several occasions was the representative at the Annual Panel Conference. He was also chairman of the Huddersfield Division, B.M.A., and a prominent member of the Scottish societies which are features of English towns and cities. His wise counsel and natural Scottish caution were a great asset to the town, and he served with distinction on the Local Medical War Committee during the whole period of the European War, and was the most prominent member of the medical bureau, dealing with the accounts for evacuated children. His memorial service was attended by most members of the profession in the town, and his presence at medical gatherings will be sorely missed.—W. H. S.

Dr. HERBERT SHARPE, for twenty-one years medical superintendent of Ware Park Sanatorium, Herts, died suddenly at Bexhill on May 7. He was born at Peterborough on April 15, 1883, and from Haileybury College went to Pembroke College, Cambridge, and thence to Guy's Hospital after taking his B.A. in 1906. He qualified M.R.C.S., L.R.C.P. in 1914 and served in the last war as captain, R.A.M.C.(T.), with promotion to the rank of brevet major. Dr. Sharpe was then in turn assistant M.O. at Frimley Sanatorium, chief tuberculosis officer for North Staffs, medical superintendent of King George's Sanatorium for Sailors at Liphook, and resident M.O. at the Hull Tuberculosis Sanatorium at Cottingham until his appointment in 1923 to be superintendent at Ware Park. He joined the B.M.A. in 1919 and wrote two papers which appeared in these columns, one of them reporting a case of primary actinomycosis of the lung.

Dr. JOHN DICK, medical superintendent of St. James's Hospital, Leeds, died on May 20, aged 51. After schooldays at Ayr Academy he entered the University of Edinburgh as a medical student and graduated M.B., Ch.B. in 1915, and later took the D.P.H. His first appointments were as house-physician and house-surgeon at the Edinburgh Royal Infirmary,

and he served during the last war with a commission in the R.A.M.C., attached to the King's African Rifles in East Africa. In 1920 he joined the staff of Fir Vale Hospital, Sheffield, and became deputy medical superintendent there. He left Sheffield on his appointment to Leeds in 1926. With the appropriations which took place under the Local Government Act of 1929 Dr. Dick had charge not only of St. James's Hospital but also of St. Mary's Infirmary, St. George's Infirmary, Cookridge Hospital, and, later, the institution which became known as St. James's North. He was a fine organizer and was largely responsible for the changes, extensions, and modern improvements which made St. James's the largest hospital of its kind in the country. Two of his brothers are medical men: Dr. James Hamilton Dick, of Bexhill-on-Sea, and Dr. Kenneth S. Dick, of Halifax.

Dr. BENJAMIN WAINMAN, who practised in Dewsbury Road, Leeds, for nearly half a century, died on May 14, aged 80. He was born on July 4, 1864, and studied medicine at the Yorkshire College, Leeds, taking the M.R.C.S., L.R.C.P. diplomas in 1889. He was police surgeon for the B Division of Leeds, 1914–23, and had served on the City Council for nine years and was chairman of the Leeds Public Health Committee. Dr. Wainman had been a member of the B.M.A. for 40 years, and he and his wife celebrated their golden wedding in 1944. Two of his children are members of the medical profession.—Dr. Wilfred Wainman and Dr. Leila Mary Wainman.

Dr. FRANK RAYMOND CROOKES, of Eckington, Derbyshire, died on May 9 after a long illness, aged 39. He was the only son of the late Dr. G. W. Crookes, of Eckington, and studied medicine at the University of Oxford and at Sheffield, graduating B.M., B.Ch. in 1930, and joining the B.M.A. soon afterwards. He entered the R.A.M.C. as temporary lieutenant in May, 1940, and was promoted war substantive captain a year later, retaining that rank when he relinquished his commission in August, 1944, on account of ill-health.

Universities and Colleges

UNIVERSITY OF OXFORD

In a Congregation held on May 3 the following medical degrees were conferred:

D.M.—*In absence:* F. Fulton.

B.M., B.CH.—J. P. Herdman, W. J. H. Butterfield, P. L. Skeggs, I. V. Polunin, H. J. Shaw, R. A. B. Drury, Susan A. J. Chappel, Janet E. Poulton, Jean M. Briscoe. *In absence:* C. L. Balf, D. C. G. Bett, H. R. Morton, M. I. Bostock, H. D. Darcus, P. C. Elmes, G. R. B. McCarter, J. D. Judah, P. J. N. Cox.

UNIVERSITY OF CAMBRIDGE

At a meeting of the Senate held on May 8 to discuss a number of reports the Master of Trinity Hall (Prof. H. R. Dean, M.D.) said that the reports of the Council of the Senate and of the General Board recommending the establishment of a Department of Medicine under the direction of Dr. R. A. McCance had been read with great pleasure by members of the Faculty of Medicine. The establishment in Cambridge of a department devoted to the advancement of medicine by research had been desired for many years. On the retirement of Sir Humphry Rolleston in 1932 from the Regius Chair of Physic the wish for a Department of Experimental Medicine was again expressed, and a few years later Sir Humphry's successor, Sir Walter Langdon-Brown, advocated the establishment of a chair in experimental medicine. On the appointment of Dr. Ryle to the Regius Chair the University established a Department of Medicine, and in 1938 a Readership in Medicine was established for Dr. McCance. In 1944 the Interdepartmental Committee endorsed the proposals put forward by the representatives of Cambridge University for the establishment of a School of Clinical Research, to consist of a number of units of which the first might be Departments of Experimental Medicine, of Radiotherapy, and of Psychiatry. It was the generous financial help of the Medical Research Council that had enabled the University to propose the establishment of the first of those departments. Prof. Dean was glad to put on record the appreciation of the Faculty of Medicine of the good will and co-operation with which the Governing Body and honorary staff of Addenbrooke's Hospital had met the proposals of the University, and also its lively satisfaction at the generous recognition which the M.R.C. had given to Dr. McCance's work.

At a Congregation on May 19 the following medical degrees were conferred:

M.D.—W. H. Mylechreest. M.B., B.CHIR.—*P. R. A. May. M.B.—*J. W. D. Buttery.

*By proxy.

UNIVERSITY OF DURHAM

At a Convocation to be held in July the honorary degree of D.Sc. will be conferred on Sir Alexander Fleming, F.R.S., F.R.C.P., F.R.C.S., and the honorary degree of D.Hy. on Sir Wilson Jameson, M.D., F.R.C.P.

UNIVERSITY OF GLASGOW

At a special graduation ceremony to be held on June 26 a number of honorary degrees will be conferred, including the LL.D. on Major-Gen. Sir John Taylor, C.I.E., D.S.O., M.D., I.M.S.(ret.), late Director of the Central Research Institute, Kasauli.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

The Morison Lecture on "Recent Experiences in a Neuropsychiatric Division of Medicine" will be delivered by Mr. Norman M. Dott at the College (9, Queen Street, Edinburgh) on Friday, June 15, at 5 p.m. Medical graduates and senior students are cordially invited to attend.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

H.R.H. the Princess Royal, who is an Honorary Fellow, has sent a gift to the Royal College of Surgeons for the Restoration and Development Fund of the College.

The following lectures will be delivered at the College (Lincoln's Inn Fields, W.C.) at 4 p.m. each day. June 6, Arris and Gale Lecture by Dr. D. V. Davies, "Synovial Membrane and the Synovial Fluid of Joints." June 11, Arris and Gale Lecture by Prof. E. Davies, "Early Development of the Human Embryo." June 13, Hunterian Lecture by Air Vice-Marshal Geoffrey L. Keynes, "Surgery of the Thymus Gland." June 14, Hunterian Lecture by Col. Elliott C. Cutler, Hon. F.R.C.S., "Management of Battle Casualties." The lectures are open to medical practitioners and advanced students.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH

At a meeting of the Royal College of Surgeons of Edinburgh held on May 18, with Prof. R. W. Johnstone, President, in the chair, the following candidates, having passed the requisite examinations, were admitted Fellows:

F. E. D. Hallon, H. A. Hashemian, A. W. Khan, W. Laurence, M. R. Liddell, C. B. Limerick, J. W. Peden, A. L. Schofield, D. M. Sheppard, Betty V. Slesser, I. J. Thomas, M. E. Winston.

The Henry Arthur Dalziel Ferns Bursary was, after a competitive examination in organic chemistry in its application to medicine, awarded to M. C. Berenbaum.

COLLEGE OF PHYSICIANS AND SURGEONS OF BOMBAY

The Council of the College of Physicians and Surgeons of Bombay has placed on record its deep regret for the loss sustained by the death of Surg. Gen. Henry Wickham Stevenson, C.S.I., I.M.S.(ret.), who was one of its Foundation Fellows, a member and the first President of the College Council. The resolution states that it was on his suggestion that the constitution of the College was modelled on the lines of the Royal College of Surgeons of England. "General Stevenson was a man of broad views, various activities, and wide sympathies. It was he who had started the practice of Indianizing the Medical Services in the Province by appointing the late Dr. Y. G. Nadgir, an Indian and that too a non-I.M.S. man, as one of the full-time professors in the Grant Medical College in 1913. This had happened 32 years ago, when the idea of Indianization of the Services was not properly conceived and much less practised."

Medical Notes in Parliament

Mr. Churchill on May 23 tendered his resignation to the King and was entrusted with the formation of a new Government. All members of the old Government went out of office with the Prime Minister. Parliament is to be dissolved on June 15. A General Election will follow on July 5.

Teeth of School-children

On May 15 Mr. LINSTEAD asked the Minister of Education whether, in view of the bad condition of the teeth of school-children, as evidenced by the findings of the Interdepartmental Committee on Dentistry, he would consider the appointment of a dental surgeon on the central advisory councils set up by the Education Act, 1944, in order that the development of the school dental service and of education in the care of teeth might be kept in the forefront of educational reforms. Mr. BUTLER: While I am fully alive to the importance of the school dental service, I do not see my way to increase the membership of either of the central advisory councils.

Future of National Service

Intervening on May 16 in a debate on the resettlement of Service personnel and war workers, Mr. ERNEST BEVIN said the nation would probably have to face for a number of years national service of some kind or military training. There were 1,000,000 men over 65 and women over 60 in industry. The war had naturally taken its toll of these. The number of juveniles now available to go into industry was reduced because of the heavy fall in the birth rate between 1922 and 1930. The nursing profession gave him great anxiety. The Ministry of Labour would make efforts to induce women coming out of the Forces and others to take up nursing training, which the Government was ready to assist financially in order to build up a nursing force. Many nurses were wanted urgently for Burma and the Far East. With regard to the relaxation of controls, men over 65 and women over 60 would be allowed to leave their jobs and not be required to take others. Women over 50 would be allowed to leave their jobs unless it was vital for them to remain. Women over 40 would no longer be called up for interviews and women under 21 would no longer be required to leave home.

Negotiating Committee

Dr. HADEN GUEST asked on May 17 whether the Minister of Health had any statement to make on the results of his discussions with the Negotiating Committee of the medical profession on the National Health Service. Mr. WILLINK replied that he did not think he could usefully make any statement at that stage.

Mr. WILLINK announced on May 17, in answer to Dr. Haden Guest, that he would at an early date meet the Negotiating Committee, possibly for the last time at this stage. He said he would then be in a position to relate their views to those of the local authorities and to discuss the matter with his colleagues. Dr. SUMMERSKILL asserted that enlightened medical associations regarded with disfavour these negotiations which were being conducted behind the scenes. Dr. MORGAN said it was in perfect order, and an established trade union practice in any organization of workers, medical or other, for reports not to be required during the negotiations.

Freed Channel Islands

Reporting to the House of Commons on May 17 after his visit to the Channel Isles, Mr. HERBERT MORRISON said the health and physique of the population there were better than he had dared to hope. He had been impressed by the healthy appearance of the children. This was largely due to the supplies which during the past winter the islanders received from the British Red Cross and Order of St. John through the International Red Cross. So far as he could ascertain, the Germans had not attempted to divert the Red Cross supplies. The Germans had left the premises they had occupied in a filthy condition. That was even true of the hospitals. He could not say whether there was an adequate supply of doctors in the Islands. That difficulty had not been mentioned to him.

Mr. KEELING asked whether Mr. Morrison would give island doctors priority to return. Mr. Morrison did not reply.

Mental Institution Nurses

Mr. JOHNSTON announced on May 17 that the chairman of the Scottish Nurses' Salaries Committee had given him a summary of the recommendations on which the Committee had agreed up to that date. The summary recommended scales and salaries for male and female mental institution nurses up to and including the charge nurse or ward sister. It also made recommendations on hours of work, annual leave, and sick pay. A circular was being sent to all employing authorities commending adoption of the Committee's recommendations. He hoped soon to present to Parliament a complete report from the Committee on the salaries and conditions of service of nurses in mental institutions.

Shortage of Doctors in Evacuation Areas

Sir HERBERT WILLIAMS asked on May 17 if Mr. Willink's attention had been drawn to the shortage of doctors in many of the evacuation areas and what steps were being taken to reinforce the strength of the medical profession in those districts to which many evacuees would soon return. Mr. WILLINK replied that any special shortage of doctors caused by movements of population of that kind was a matter for consideration by the Local Medical War Committee for the area. After taking account of any doctors coming into the area, either on release from the Forces in an early demobilization group or otherwise, it would be open to the local committee to apply through the Central Medical War Committee for the special release of a doctor where the circumstances of the area justified that course.

Ministry of Health Appointments

Mr. WILLINK stated on May 17 that one pensioned medical officer from the R.A.F. had been appointed to the Ministry of Health during the past 12 months. He had since resigned. Such appointments were made on a temporary basis pending the resumption of normal permanent recruitment. Four pensioned medical officers from the R.A.F., one of whom had resigned, had been appointed to temporary posts in the Ministry of Pensions during the same period.

Dietetic Advice for Repatriates

Mr. ARTHUR HENDERSON told Major Gates on May 17 that not all repatriated prisoners of war were in need of special dietetic advice. It was given orally by medical officers at reception camps to those who needed it. The latter also distributed as necessary a printed leaflet, which contained hints on diet during recuperative leave for those whose digestion had been impaired by their privations in captivity, and advice on which types of food were suitable and unsuitable and on the size and timing of meals. It was not thought necessary to provide repatriates on leave with elaborate charts specifying quantities of foodstuffs that should be eaten. Any man requiring such a carefully regulated diet would be admitted to hospital before being sent on leave.

Treatment of Mental Illness in Service Patients

Mr. WILLINK, replying to Mr. Messer on May 17, said members of H.M. Forces suffering from mental illness were dealt with by the medical services of the Forces. Some accommodation in civilian mental hospitals had been especially assigned to those services for the purpose. In the neurosis centres provided under the E.M.S. there were, on March 31, 994 males and 149 female Service patients. After-care of members of the Forces discharged from neurosis centres as well as from mental hospitals was undertaken by the Provisional National Council for Mental Health in collaboration with the Mental After-Care Association.

Cost of Deaf Aids.—On May 8 Mr. KIRBY asked the President of the Board of Trade if his attention had been drawn to the number of men and women who had become deaf during the period of heavy bombing; and whether, to assist those who desired to obtain deaf aids, he would have inquiries made into the high cost of these appliances. Mr. DALTON said that the Central Price Regulation Committee was examining this matter in consultation with the Electro-acoustics Committee recently set up by the Medical Research Council.

Requisitioned Harley Street Houses.—Sir E. GRAHAM-LITTLE on May 16 drew attention to the shortage in the Harley Street area of consulting-rooms used by medical consultants, through requisitioning of houses by the fighting Services. He asked the Secretary of State for War to release as many of these premises as possible, in view of the early return of consultants from war service. Sir JAMES GRIGG said the War Office had requisitioned three houses in Harley Street. Two of them were occupied, the third would be occupied when alterations had been completed. He was at present unable to release any of these houses.

Medical Examination before Courts Martial.—On May 15 Mr. TURTON asked the Secretary of State for War whether soldiers were examined by a psychiatrist before being tried by field general courts martial. Sir JAMES GRIGG said that before such a trial a man was always examined by a medical officer, but not necessarily by a psychiatrist.

Cholera among British Officers in Calcutta.—Mr. AMERY said on May 17 that fifteen cases of cholera occurred at the end of last month among the British officers billeted at a hotel in Calcutta. Of these one died as a result of developing pneumonia. Three of the waiters were afterwards discovered to be cholera carriers. Immediate action was taken and the outbreak was at an end. In Burma there had been 26 sporadic cases of cholera, mostly among Indian troops. There had been no other cases of cholera among British troops in India and Burma since 1943. As cholera was endemic in these areas the comparative immunity of the troops was a tribute to the skill and devotion of the medical services and the value of modern protective measures.

Leprosy in Britain.—In this country 22 cases of leprosy have been brought to notice during the war, of which 9 have been in persons known to be British subjects.

Public Health Laboratory Service.—The provision of a public health laboratory service on a national basis after the war and the form which any such service should take are matters which are under consideration as part of the wider proposals for a comprehensive health service.

Medical News

Lord Horder will deliver the third Sanderson-Wells Lecture at the Middlesex Hospital on Wednesday, June 6, at 4 p.m. The subject is "Food and Rheumatism." Members of the medical profession are cordially invited to attend the lecture.

A meeting of the Nutrition Panel of the Society of Chemical Industry will be held at the Rooms of the Chemical Society, Burlington House, Piccadilly, W., on Wednesday, June 6, at 2.30 p.m., when a paper on "Protein Hydrolysates—Their Preparation and Clinical Uses" will be read by Dr. D. P. Cuthbertson. A discussion will follow.

A clinical meeting of the Middlesex County Medical Society will be held at the North Middlesex County Hospital at 3 p.m. on Saturday, June 9.

The lecture by Dr. F. M. R. Walshe on "Infantile Paralysis," to be given before the Royal Society of Arts, John Adam Street, Adelphi, W.C. (postponed owing to VE holidays) has now been arranged for Tuesday, June 12, at 1.45 p.m.

At the meeting of the Board of the Finney-Howell Research Foundation on March 2 fellowships were renewed for a third year for Dr. Nelicia Maier; for a second year for Drs. Muriel Virginia Bradley and Margaret Aston Kelsall; and a new fellowship was awarded Dr. Elizabeth Cavert Miller, to work at the University of Wisconsin. Applications for fellowships for 1946 must be made to the office of the Foundation (Medical and Chirurgical Faculty Building, 1211, Cathedral Street, Baltimore, Md.) before December, 1945, to be eligible for consideration.

The Minister of Health has notified all local authorities and port health authorities that a photographic display is now available for use in the educational campaign against venereal diseases. This display tells frankly what the venereal diseases are, how they are caused, what are their effects, and why skilled treatment should be obtained at the earliest possible stage. It has been prepared for private showing to those who wish to see it, and to members of the two sexes separately; it is being offered by the Ministry of Information to factories throughout the country. Copies on free loan are available to local authorities through the Central Council for Health Education.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* most infectious diseases fell in incidence during the week, the drops being as follows: measles 727, whooping-cough 251, dysentery 126, diphtheria 91. Two cases of typhus fever were imported into the country.

The chief local variations in the trend of diphtheria were decreases of 28 in Yorks West Riding, 23 in Staffordshire, and 14 in Northumberland, and a rise of 9 in London. The decline in whooping-cough was fairly general throughout the country; Yorks West Riding showed a decrease of 36. Although the notifications of measles fell substantially, there was a rise in several counties, particularly in the south, where notifications were higher than last week by the following numbers: Northamptonshire 174, Sussex 113, Dorsetshire 83, Berkshire 71, Wiltshire 64, Middlesex 62; Southampton reported 280 fewer cases, Monmouthshire 207, Glamorganshire 206, Lancashire 114, and Gloucestershire 106.

The notifications of dysentery fell for the third week, but the incidence is still high—343. The largest returns were Lancashire 63, Staffordshire 39, Yorks West Riding 30, London 25, Kent 19, Surrey 18, Essex 18, Gloucestershire 16, Warwickshire 14, Middlesex 10.

In *Scotland* measles showed 152 fewer notifications than last week, whooping-cough 74, and dysentery 61, but there were 36 more cases of pneumonia, and 25 more of diphtheria. The largest returns for dysentery were Aberdeen 22, Edinburgh 22, Dundee 13, Glasgow 12. The recent large outbreak in Aberdeen, involving 245 cases in the King's Gate district of the city, had its origin in a dairy.

In *Eire* the chief feature of the returns was an outbreak of dysentery in Monaghan U.D., involving 20 persons.

In *Northern Ireland* there were 19 fewer notifications of scarlet fever, 10 fewer of whooping-cough, and 9 fewer of measles; there was a small increase of 3 in the incidence of diphtheria.

Week Ending May 19

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,340, whooping-cough 1,068, diphtheria 498, measles 14,126, acute pneumonia 612, cerebrospinal fever 64, dysentery 434, paratyphoid 2, typhoid 2, typhus 7 (imported cases).

No. 19

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended May 12.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1945 (a)	1945 (b)	1945 (c)	1945 (d)	1945 (e)	1944 (Corresponding Week) (a)	1944 (b)	1944 (c)	1944 (d)	1944 (e)
Cerebrospinal fever	53	2	22	2	5	70	5	26	4	2
Deaths		3	1				1	—		
Diphtheria	413	23	118	69	11	584	45	161	70	33
Deaths	7	1	1	1	2	7	—	—	1	1
Dysentery	343	25	112	20	—	280	21	54	5	—
Deaths				—	—				—	—
Encephalitis lethargica, acute	1	—	—	—	—	4	—	—	—	—
Deaths		1					—			
Erysipelas			30	10	4			48	4	4
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				14					13	
Deaths	38	3	9	6	2	53	7	14	8	4
Measles*	12,412	822	203	53	12	2,132	210	560	161	16
Deaths	13	1	2	—	—	4	2	—	2	—
Ophthalmia neonatorum	55	3	6	—	—	75	5	14	—	—
Deaths										
Paratyphoid fever	3	—	—	—	—	10	1	20	62	—
								(B)	(B)	
Deaths	—	—	—	—	—	—	—	—	1 (B)	—
Pneumonia, influenzal†	511	25	6	7	3	704	52	1	12	2
Deaths (from influenza)	10	—	1	—	1	14	—	1	1	1
Pneumonia, primary			210	26				199	18	
Deaths		24		13	13		35		9	9
Polio-encephalitis, acute	1	—				—	—			
Deaths		—					—			
Poliomyelitis, acute	6	—	—	—	1	2	—	3	—	—
Deaths		—					—			
Puerperal fever			16		—		1	18		
Deaths										
Puerperal pyrexia‡	126	9	13	2	—	150	16	18	2	1
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,365	69	214	16	31	1,791	133	199	20	64
Deaths	—	—	—	—	—	2	1	1	—	—
Smallpox	—	—	—	—	—	1	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	4	—	2	10	2	8	—	1	5	4
Deaths	—	—	—	—	—	1	—	—	—	—
Typhus fever	2	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	799	31	75	35	13	2,548	262	179	42	16
Deaths	6	—	3	—	1	14	2	1	—	1
Deaths (0–1 year)	340	35	70	29	24	354	44	66	29	21
Infant mortality rate (per 1,000 live births)										
Deaths (excluding stillbirths)	4,664	662	672	217	140	4,290	615	553	222	134
Annual death rate (per 1,000 persons living)			15·3	14·0	§			12·7	14·4	§
Live births	5,833	621	809	468	232	7,886	883	1028	593	303
Annual rate per 1,000 persons living			16·2	30·2	§			20·9	—	§
Stillbirths	171	14	34			208	20	35		
Rate per 1,000 total births (including stillborn)			40					33		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

§ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Attiology Westcent, London.* ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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ANY QUESTIONS?

Motor Nerve Supply to Tongue and Lips

Q.—*What is the embryological explanation for the motor nerve supply to the tongue and lips (i.e., the most "anterior" part of the alimentary canal) being via the 12th cranial nerve, yet the pharynx, larynx, etc., more distal parts of the alimentary canal, are supplied by the 9th and 10th nerves?*

A.—The comparative study of anatomy shows that the tongue musculature was evolved by forward extension of ventral neck musculature into the floor of the mouth: like the infrahyoid musculature it is thus a derivative of the body wall (somatic) musculature. Now it has been established in various submammalian animals that this ventral neck musculature is developed in the embryo from certain myotomes. In man, however (as perhaps in mammals generally), the process of development has been modified and it is differentiated *in situ*. It is nevertheless innervated in man by a nerve, the hypoglossal (closely associated with the ansa hypoglossi), which has a course and central connexions that identify it with the nerves which supply the ventral "neck" musculature in fish, amphibians, and reptiles—i.e., it is a somatic motor nerve in series with the ventral (anterior) roots of spinal nerves. The hypoglossal nerve, again, has a rudimentary dorsal ganglion in embryos (including the human), which observation emphasizes the comparison with spinal nerves.

The musculature supplied by the 9th and 10th nerves develops as a part of the wall of the pharynx in man, as in fish. These nerves in man leave the skull above the hypoglossal nerve, and the relation is similar in fish (the equivalent to the hypoglossal nerve is commonly known as the "hypobranchial" nerve in fish). The inquiry resolves itself, then, into an inquiry concerning the arrangement in fish. Now it is known that in fish and amphibian embryos a number of myotomes become suppressed at the anterior end of the series, in the posterior head region, and that the hypoglossal nerve loses some of its more cephalad rootlets in the course of development. The hypoglossal nerve is, then, presumed to have had an origin (in the central nervous system) which originally extended further forwards and overlapped the 9th and 10th nerves.

The explanation of the backward extension of the 10th nerve as far as the intestines is obscure. The human arrangement obtains also in fish. This part of the vagus contains autonomic fibres of the cranial outflow, which are distributed to a region that is also supplied from the thoracic outflow. The distribution of the autonomic system does not therefore follow so clear-cut a segmental pattern as that of the nerves of the body wall. A similar problem is afforded from the distribution of autonomic fibres from the thoracic outflow to various structures in the head.

The actual numbering employed for cranial nerves was based on the early accounts of human anatomy. It is well known that it does not well express the pattern of the cranial nerves: namely, there is a cranial nerve, the "nervus terminalis," in advance of the 1st or olfactory, and the 11th might well be described as a portion of the 10th. The generally recognized enumeration must be retained for convenience.

Skodaic Resonance

Q.—*Skodaic resonance, an area of resonance on percussion, is sometimes found over a pleural effusion. This is said to be due to relaxed lung tissue. How can the lung tissue be relaxed over a pathological process which is "pressing on" the lung? Has any other explanation been put forward?*

A.—Skodaic resonance is found over the lung immediately *above* an effusion, not *over* the effusion itself. The normal lung is an elastic organ and is stretched to fill the pleural cavity; when part of that cavity is occupied by fluid the lung is at first relaxed. This relaxation is said to be responsible for the peculiar "boxy" note heard on percussion above an effusion. When the fluid fills the pleural cavity the lung becomes completely collapsed and finally compressed. The percussion note is then dull, but very occasionally hyper-resonance can occur over a chest full of fluid. Bosanquet (*Brompton Hosp. Rep.*, 1937, **6**, 59) described two examples of this rare phenomenon and the writer has seen one other; the cause is unknown.

Calcium in Water

Q.—*The water in this district (Scopwick, Lincoln) is so heavily charged with calcium carbonate that particles may be seen floating on the surface of water that has stood a short time; kettles are heavily encrusted with the salt. What is the modern opinion of the effect this water has upon the body? Constipation is a definite result to those visiting and unused to the water. I have never experienced greater "hardness" anywhere else in England, and I have lived in many areas.*

A.—The furring of kettles and boilers and the wastage of soap are the chief disadvantages of a very hard water. Even if the water is extremely hard it is unlikely to contribute more than 200 mg. of calcium to the daily intake, which usually runs between 600 and 1,500 mg., and this addition is beneficial rather than harmful. The hard water is unlikely to be responsible for visitors' constipation. In this connexion one must remember (*a*) that a change of diet and habitat is very liable to make a person constipated for a few days and (*b*) that people are very prone to make something like the water, with obvious drawbacks, the scapegoat for their minor medical maladies.

Prostigmin in Arthritis

Q.—*Can you give me any information about the use of prostigmin to relieve pain in cases of rheumatoid arthritis? Is it of any use in osteo-arthritis?*

A.—The claim has been made that injection of prostigmin combined with atropine relieves the pain of rheumatoid arthritis, and the writer has had the opportunity of testing this in a limited number of cases. Where the pain is due to spasm of the muscles associated with affected joints relief is given because the effect of the drug is to relax spasm, but in the absence of spasm (and it is not a common feature in true rheumatoid) better results are obtained by the use of the more common analgesics such as aspirin, phenacetin, codeine, etc., alone or in combination. In cases where cramp is a troublesome feature prostigmin has also given prompt relief, but the writer has not been able to keep such cases under observation for long enough to say how lasting the relief may be. It is therefore reasonable to give prostigmin and atropine where spasm is present, but when the spasm has relaxed it is desirable to prevent its recurrence by suitable physical measures, such as the application of light splints, rather than to continue the administration of such powerful drugs, which have been observed to produce undesirable effects if administration is prolonged.

The use of prostigmin was advocated in an American medical journal and the article was quoted in a popular magazine; but in the first case in which dramatic results were obtained and which is described the condition was quite obviously not rheumatoid arthritis but subacromial bursitis, in which the pain is much more severe than in arthritis and is directly due to spasm; of the other cases described some were probably rheumatoid, though the description was not very scientific, while at least one was of a different nature. This being the case, the article fails to carry conviction, and further investigation is required.

"The Sweats"

Q.—*Is anything known or surmised about the aetiology of the sweating sickness which was apparently so very common in the fifteenth and sixteenth centuries and from which Charles Churchill (the poet) died in 1764? It seems from various historical works that it was at times widespread and extremely fatal. Has any conclusion, other than that it might have been a virus infection, been reached?*

A.—The late Sir William Hamer (*The Milroy Lectures on Epidemic Disease in England—The Evidence of Variability and of Persistency of Type.* 1906. London: Bedford Press) gave reasons for thinking that the sweats were epidemics of influenza—an opinion which is probably held by most epidemiologists of this generation, although, naturally, the reasoning is wholly by analogy. Suggestive points are: (1) rapid diffusion, (2) general symptoms, (3) lack of evidence that the underfed and overcrowded classes suffered more than the well-to-do—evidence plentifully obtainable in other plagues of ancient times.

Hallux Valgus

Q.—*What is the prognosis of arthroplasty excision of base of phalanx for hallux valgus in a female 65 years old? Does age affect the outlook? What is the period of incapacity, and should one recommend surgical treatment at this age?*

A.—In a patient of 65 a hallux valgus is likely to be but a part of a widespread foot disturbance with a good deal of splaying of the metatarsals. Removal of the base of the phalanx at this age will do little to remedy this. The patient will get more relief from the use of appropriately shaped pads and metatarsal straps, such as

could be fitted by a properly qualified chiropodist. In patients of this age the only indication for operation would be a local pain caused by a recurrent bursitis or an osteophytic outgrowth, and the operation should be the smallest possible—i.e., removal of exostosis and bursa, and so on. Even so, the condition of the circulation in the foot should be carefully ascertained beforehand and no operation undertaken unless it is satisfactory. Local gangrene and delayed healing may follow quite simple operation on the toes in older patients.

There is a tendency to underestimate the period of incapacity which follows operation upon the great toe. It would probably be wise to estimate that six weeks will elapse before the patient is able to wear ordinary shoes.

Physiology and Psychology of Craving

Q.—*Can any reader tell me what is the cause of a "craving" for any special food, drink, or smoke? What are the conditions precedent to such a state (is it?) of mind?*

A.—As a psychologist, I should first of all look for a physiological cause. We do not know enough about biochemistry to detect *any* chemical deficiency; but we do know that the hypoglycaemic child is the one who craves for sugar—because he needs it. Piglets, immediately they are released from the spotlessly clean sties, rush to eat earth, not because they like earth as such, but because they need the iron in it. A craving for pickled onions may be an aid to digestion in the intestinal canal. It is to be remembered that when the body had need of some such food, it feels the need for it although it has no knowledge of what it needs.

The psychopathologist more commonly meets with the *dislike* for certain substances, such as milk or lettuce, and in such cases this can usually be traced back to experiences in childhood, when either too much was forced on the child, or the child choked with the skin on the milk, etc. On that analogy one would expect that a craving of psychological origin would be due to the association of that food with pleasure, probably of a very fundamental kind, such as of a person greatly loved in childhood, or of a strong sensuous gratification.

We have not met a craving for a specific type of tobacco with a refusal of all others, but the craving to smoke, and chain smoking in particular, which is often more difficult to give up than alcohol, is usually traceable to the persistence of disorders or exaggeration of the sucking tendency in infancy. But it is an activity which starts in the boy or girl as a desire to be grown up, and therefore, like other forms of neurosis, compulsive smoking gratifies two opposing tendencies—the infantile and the adult—not to speak of its soothing narcotic effect, which is partly infantile. I have a patient at the moment who has the craving to light a cigarette and take a few puffs, but who then throws it away; this refers back to a craving for, but rejection of, the mother's breast.

Is a Toothbrush a Good Thing?

Q.—*What evidence is there that cleaning the teeth with a toothbrush is a good thing? Does the modern view support the statement that "the use of a toothbrush saves the teeth at the expense of the gums"? The best teeth I have seen, and the only jaws with 32 healthy teeth, have been in those who have never used a toothbrush.*

A.—The use of the toothbrush is an essential habit for everyone who wishes to have healthy teeth and gums. Brushing the crowns of the teeth removes debris and keeps the surfaces polished and thereby minimizes the risk of decay. Places, such as the interdental spaces, where the bristles cannot reach are always the danger spots for the commencement of decay. But just as important is the good, not harm, derived from brushing the gum margin. The secret for healthy gums is friction of the margins by the toothbrush, which keeps the epithelial surfaces well keratinized and prevents the onset of pyorrhoea. There are other methods of cleaning the teeth and gum margins, but the toothbrush must be given priority. For every person with thirty-two healthy teeth who have never used a toothbrush there must be ninety and nine who are cursed with no teeth at all by the time they have reached middle age.

Malignant Cells in Sputum

Q.—*What is the technique for the demonstration of malignant cells in sputum in the diagnosis of carcinoma of the bronchus?*

A.—The method generally used for this purpose was described by the late Prof. L. S. Dudgeon (*St. Thom. Hosp. Rep.*, 1936, **1**, 51). From a fresh specimen of sputum the more cellular portions are selected—especially any which are blood-stained—spread on a slide, and fixed while still wet in Schaudinn's solution. After treatment with methylated spirit to which a few drops of tincture of iodine have been added, and washing in water, the film is lightly stained with Mayer's haemalum (about 2 minutes), left in tap water until blue, counterstained with eosin, and dehydrated and mounted in balsam in the usual way. The questioner should refer to Dudgeon's paper for an account and illustrations of the appearances of clumps of malignant cells in the sputum. He will also be well advised to examine a considerable number of specimens from patients with and without cancer of the lung before venturing to affirm that he has identified malignant cells. This is difficult even with experience, and mistakes have been made. It is no doubt for this reason that many pathologists are reluctant to attempt this examination.

Radiotherapy for Dupuytren's Contracture

Q.—*Is there any evidence that radiotherapy is of value in the treatment of Dupuytren's contracture?*

A.—Radiotherapeutic technique is always a difficult matter to write about. It is so liable to smack of "prescribing by post," whereas, of course, innumerable factors of clinical experience come into it when dealing with each particular patient. However, I would say that the answer to the above question is yes: in the early case both subjective and objective improvement is obtained. My own technique is by fractional doses over 10 days to produce a first-degree erythema.

Quarantine for Measles

Q.—*What is the necessary period of quarantine for measles? The Board of Education lay down this period as a minimum of three weeks from the appearance of the rash. The Medical Officers of Schools Association booklet lays down ten days from the appearance of the rash.*

A.—Infectivity of measles is highest in the pre-eruptive stage and thereafter wanes rapidly. The period over which the virus remains viable and infective in any given case is probably determined by the amount of upper respiratory catarrh which accompanies the attack. Thus, in measles well modified by serum quarantine of no more than 4 to 5 days is necessary. At the other end of the scale clinical experience indicates that a sharp attack of measles with pronounced catarrhal features or accompanied by coincident respiratory infections such as whooping-cough, influenza, etc., may remain mildly infectious up to 12–14 days from onset. Thus, a period of 10 days from the appearance of the rash provides very adequate quarantine for all cases.

Corneal Scar

Q.—*In the* JOURNAL *of April 28, in an answer about a contact lens for corneal scar, your adviser hints at "more simple and less expensive methods." What alternative would he suggest to obtain the maximum optical efficiency?*

A.—Where one eye interferes with the vision of the other, the following are the usual methods of obtaining relief: (1) a ground glass in the appropriate spectacles in front of the interfering eye; (2) a "clip-on" opaque disk similarly placed; (3) a Chavasse glass (i.e., a crinkled glass) so that the cosmetic appearance is altered as little as possible.

INCOME TAX

Pension: Claim for Expenses

F. S. is in receipt of a pension as from the death of her husband on active service. Can a claim be made (*a*) for insurance (endowment) and (*b*) for cost of storage of furniture, which was necessitated by enemy action?

*** (*a*) Yes, if the insurance is on the life of F. S. (*b*) No—there being no assessed income against which such cost can be off-set as a relevant expense.

University Scholarship

M. P. qualified two years ago and has now been granted a scholarship of £110 per annum. Is this liable to income tax?

*** Section 28 of the Finance Act, 1920, provides that income arising from a scholarship held by a person receiving full-time instruction at a University . . . shall be exempt from income tax. If any doubt arises as to whether a particular scholarship comes within the section, the Commissioners of Inland Revenue are authorized to consult the Board of Education on the point. M. P. might ask the university authorities whether the point has been decided in connexion with a previous holder of this scholarship.

Locumtenent and Travelling Expenses

J. D. sends an inquiry of a general nature.

*** In our opinion a locumtenent working for short periods in different areas during a financial year is normally to be regarded as exercising his profession in such a way as to bring him under Schedule D and to entitle him to all expenditure incurred "wholly and exclusively" for the purposes of his profession, including the expense of travelling from his residence to the places where he does his professional work. The correspondent to whom J. D. refers worked for one employer under terms which brought the earnings within Schedule E. That Schedule, in spite of the more stringent rule with regard to expenses, was preferable for the year concerned in the taxpayer's interest, and furnishes no guide as to the line to be taken in the usual type of locumtenency engagement.

LETTERS, NOTES, ETC.

Examinations in Stages

Mr. G. H. COLT, F.R.C.S. (London, W.1), writes: A surgeon who is well known to me was able to prepare for and make one serious attempt at passing the Final F.R.C.S. examination. He failed in one of the six parts. From then onwards he took passing shots at the examination each time it came round, but without further preparation. Each time for five times he failed in one of the six parts, and each time it was in a different part, so that in all six attempts he failed once in every part. At the seventh attempt he drew winners in all the six parts, and being freed from thraldom has become a real surgeon in the Near East. The facts given show how examinations and examiners may fail when, in the so-called higher degrees, the element of chance becomes greater than the element of ability to show one's knowledge. Examinations which hinder rather than help a prospective surgeon in the preparation for his life's work should be abolished There are excellent alternatives for testing a candidate's surgical ability, and these are safer for the public, at any rate at the start of his career!

A New Covering for Skin Dressings

Dr. R. STOPFORD-TAYLOR (Liverpool) writes: I was very interested and glad to read in the *Journal* of April 7 (p. 485) that Dr. J. E. M. Wigley had found a new use for perforated oiled silk. I would remind him, however, that the idea of using "green protective with holes" for the treatment of granulating surfaces following burns was suggested over 30 years ago. Perforated oiled silk has been freely obtainable through the usual channels of surgical supplies for over ten years. It has been perfectly satisfactory, and there is no doubt of its value as a semi-occlusive and painless dressing. I drew attention to its use in the treatment of burns in a clinical memorandum in the *Journal* of March 15, 1941 (p. 403).

Unilateral Flush after Food

Dr. A. D. MCDWYER (Dublin) writes: In the question under the above title (May 12, p. 687) the account of a transient facial erythema, appearing at the beginning of a meal and vanishing in 1/2 to 3/4 hour afterwards, seems to show a very close relationship to the auriculo-temporal syndrome, if it is not essentially the same. This syndrome, which has been the subject of reports in the literature for over half a century, is characterized by redness followed by sweating, of one side of the face: although the two areas may not have the same extent. The vasodilatation may be accompanied by very mild pain. Objective alterations in sensation in this area innervated by the auriculo-temporal nerve may be elicited. The vaso-cutaneous manifestations are produced reflexly by tasting rather than chewing, especially spicy foods and also psychically by the sight of any procedure with food which stimulates the parotid gland to activity. In a large proportion of cases, if not all, there is a previous history of trauma in the region of the parotid gland, or of parotitis, usually complicating one of the infectious fevers.

To understand the theories of causation a short account of the anatomy will be of value. The auriculo-temporal nerve, a branch of the third division of the trigeminal, receives a communication via the otic ganglion from the glosso-pharyngeal nerve, conveying secretory fibres to the parotid gland, and then pierces the latter, to supply the skin over the temporal area, part of the pinna, and over the parotid gland. This nerve also receives a branch from the cervical sympathetic trunk, and a twig from the seventh nerve. It is suggested that subsequent to injury or parotitis there is increased formation of fibrous tissue around the nerve, which becomes compressed from the swelling of the gland when the latter is stimulated into activity. Vasodilatation and sweating are the consequence of this pressure on the vegetative fibres. Another theory is that the nerve is injured, either from trauma or from parotitis, and in the subsequent regeneration the glosso-pharyngeal fibres become diverted from their purpose of supplying the parotid gland. The third view is that this phenomenon is an exaggeration of the appearance normally seen in this area on a person's face when eating. The first suggestion is the most favoured, and, as this condition has been present since birth, the possibility may be that the aetiological cause was trauma during delivery. I am not aware of any satisfactory treatment, but if the symptoms are troublesome irradiation has been suggested (W. Needles, *Arch. Neurol. Psychiat.*, Chicago, 1936, **35**, 357). In view of the causation, could this really be wise?

Yaws and Positive Kahn

Dr. G. SHEARER (Colonial Medical Service, Nigeria—on leave) writes: I read with great interest the answer to the question on "Yaws and Positive Kahn" in your issue of April 14 (p. 543). Having studied the problem of yaws closely there are certain parts of the answer I would like to comment on. I was glad it was emphasized that yaws was not endemic all over West Africa, and that in areas where it was not endemic syphilis is common. In some colonies yaws is endemic in some areas of the colony and not in others. In Nigeria, for example, yaws is endemic throughout the south, whereas in the north it is unknown, but syphilis is rife. Humidity as well as heat is a predominant factor in determining the endemic yaws areas.

The statement that the Kahn test may be rendered positive by leprosy, malaria, and trypanosomiasis is open to argument. In regard to trypanosomiasis, I think the statement is inaccurate. My colleague Dr. C. W. Hope Gill published an article in the *Journal of the Royal Society of Tropical Medicine and Hygiene* about 1931 showing that the Kahn test is not affected by that disease; and, following on his work in the area where yaws and sleeping sickness were both endemic, I had ample reasons to confirm his findings. A certain amount of work on the effect of leprosy on the Kahn test has been done lately at a leper colony I know, but nothing has been published yet. It would be premature to make pronouncements on it, but I am led to understand that the opinion formed is that the effect of leprosy on the Kahn test is so small and rare as to be of no importance whatsoever. As to malaria affecting the Kahn test, the suggestion is new to me, and I would like to be given some indications as to the authority for this statement.

In the answer given it is stated that "if a positive Kahn is due to yaws a couple of short courses of N.A.B. would almost certainly reverse it," and I agree entirely with this; but I fear the cases thus treated would come into the category of inadequately treated yaws infections, as the Kahn test would probably not remain negative. Too much has been said and written about curing yaws with one or two injections of N.A.B. If we are to take the disappearance of symptoms and external signs as a cure, then this is correct; but, to be logical, the disappearance of the primary sore in an early case of syphilis would be regarded as a cure of that disease. The only criterion of cure in yaws as well as syphilis is a permanently negative Kahn or similar serum reaction. It is unnecessary to test the cerebrospinal fluid in yaws. I have treated thousands of cases of this disease, and in many studied the results by the Kahn test, and I have no doubt that adequate courses of N.A.B. with bismuth are necessary to effect a permanent cure.

In my experience it would be a grave mistake to ignore a one- or two-plus Kahn in an African as suggested. If this is due to yaws, a small provocative dose of N.A.B. will increase the titre. A cured case of yaws in childhood will not give a three- or four-plus Kahn in adult life unless there has been a reinfection with yaws or infection with syphilis, but I would point out that the number of West Africans having yaws in childhood or young adult life who receive adequate treatment to secure a cure as defined is at present, I regret to say, very small—in fact, an infinitesimal proportion of actual cases.

Shortage of Medical Textbooks

Dr. R. D. GRAY (Chippenham) writes: The recent discussion in the House of Lords, and particularly the remarks of Lord Buckmaster, tempt me to report an example of maldistribution which may be of serious consequence if repeated up and down the country. Some months ago, when the position with regard to *Gray's Anatomy* was so acute that one London medical student resorted to an advertisement in your columns, a new copy of the latest edition was in the front window of the Salisbury branch of a popular bookseller and more were available within. While the shortage continues it might reasonably be expected that publishers would assist by confining their deliveries to the recognized medical and scientific booksellers, and so avoid offering to the general public what the medical student cannot get.

Intestinal Obstruction by Gall-stone

Dr. ROBERT ANDERSON (Birmingham) writes: About 20 years ago I was called to see a woman of 75 who had been suffering from abdominal colic and vomiting for several days. There was not much distension but there was visible peristalsis. On examination p.v. I found a hard mass behind the uterus and advised an operation for relief. Her friends would not agree to it, but a few days afterwards they asked me to bring a surgeon. When he came he could not find the mass I had found, but on opening the abdomen he put his hand down into the pelvis and brought up a coil of small intestine with a hard mass in it. He incised the bowel and the mass was found to be a gall-stone fully an inch long and nearly as broad. The patient recovered. The surgeon was the late Albert Lucas, F.R.C.S.

"Predisposition" to War Neuroses

Dr. A. HARRIS writes from Wilmslow, Cheshire: With regard to Dr. Frederick Dillon's letter (April 21, p. 570), I would draw his attention to a paper by J. G. Sheps, "A Psychiatric Study of Successful Soldiers" (*J. Amer. med. Ass.*, 1944, **126**, 271).

Corrections

Dr. K. D. Salzmann wishes to correct a mistake in the letter published on May 26 (p. 748). The sentence should read "... Dr. Read's teaching is that doctors must take more time and trouble in instructing and reassuring childbearing women" (not measuring).

In the *Journal* of May 26 (p. 758) a note was published on "Diet and Dental Health." The name of the author, Dr. A. Livingston, should have been spelt without the final "e."